Thomas A. Edison Papers

A SELECTIVE MICROFILM EDITION

PART IV
(1899–1910)

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START

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A Note on the Sources

Notebook, N-03-10-05.2

F. L. Dyer — 1.

Last week in September, 1903
Work on [illegible] patterns.

Cloth [illegible]:

No. 1. S + Cem (80 + 20); when poured, was 60°C, mould and core cold, chilling by wet rag with tap water (18° – 20°C.) Smooth core taken out before mould taken off.

No. 2. S + Cem (80 + 20); when poured, was 177°C. mould & core cold. Smooth core taken out as soon as possible.

No. 3. S + Cem (80 + 20) was 177°C, mould + core hot. Smooth core taken out as soon as possible, long before mould.

No. 4. S + Cem (60 + 40), was 177°C, mould hot; smooth core taken out as soon as possible.

No 5. S + Cem (70 + 30); was 177°C, mould + core hot; smooth core taken out

No. 6 S + Cem. (65 + 35), was 177°C. mould + core hot, smooth core can't taken out.

No. 7 S + Cem (50 + 50), was 177°C. mould + core hot; after sudden chilling, mould taken off, to take cylinder off.

F. L. Dyer

The [illegible] were, the [illegible] to be heated to about the [illegible] of the wax.

Results:

A. Cylinders Nos. 1, 2, 3, & 5 had a mottled appearance & showed cracking near under [illegible] – ~~Hence~~ Nos. 4 & 6 had a uniform structure. Hence 65% S is the maximum.

B. The ~~gold~~ mould was had a layer of gold, nevertheless, it was [illegible] attacked at the high temperature of the casting, as shown by all the cylinders having a green layer ~~[illegible]~~ on the surface, due to copper attacked by the stearic acid.

C. Tap water (18° – 20°C) was not cold enough to effect the shrinking out of the wax. In all cases it was necessary to ~~the~~ plunger ~~was~~ [illegible] with wax into ice water (ca. 4°C) to take out cylinders. Even then the shrinkage was not great enough to allow of taking out the cylinders freely, a scratching against the mould being distinctly felt.

F. L. Dyer

FRANK L. DYER 3 5 1903 ORANGE N.J.

D. Cylinders then tested on phonograph:

No 1. was found to have [illegible] in the Reaffixed way, by mistake.

No. 2. Gave very scratchy sound and was very rapidly (by 3 or 4 reproductions) worn by the stylus — as distinctly seen under the microscope.

No. 3. Gave very scratchy sound and under the microscope showed rough record and wearing by stylus after 3 or 4 reproductions.

No. 4. The mould was found to have been filled in its upper part (near the end of core) and not filled in the lower half. The record was smooth where filled and rough where not filled. The reproducer left distinct marks of wearing after 4 reproductions.

No 5. The cylinder did not fill the mould, was irregular, and was rapidly worn by reproducer.

No 6. This was smooth, the mould was not filled, the record was partly destroyed by the heating necessary to get the core out. It was considerably worn

F. L. Dyer

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by 4 reproductions.

Hence, Nos. 2–6 (i.e. all [illegible] examined) were found to be extremely soft and to be worn by reproducer in 3–4 reproductions.

I. The melting-point of the commercial S used (Mitchell's) was found to be 56°C. Its solidifying-point was found to be 5[illegible].

The melting-point of the ceresin used was found to be 52°.5–53°.5 C. Its solidifying-point was found to be 50°–52°.5 C.

Cylinder No. 6 was then examined as to alleged separation of its ingredients ~~([illegible])~~: a few milligrams were gently [illegible] off the outside layer and the melting-point determined; it was found to melt gradually between 46° & 52°C. It was found to solidify very gradually on cooling between 47° and 43°C.

A few milligrams were next scraped away from the inside of the cylinder mass (about half way in); the solid[illegible]

stet

F. L. Dyer

fication-point was found to be 45°–43°C, no difference whether by the mode of solidification of this and of the outside layer.

It was therefore concluded: 1. That the outside layer and the mass of the cylinder were identical in composition; 2. That no separation and redistribution of the ingredients takes place; 3. That no such separation and redistribution takes place at a temperature, as alleged, intermediate between the melting-point ~~and~~ or the solidification-point of the ingredients, both the melting-point and the solidifying-point of the mixture being, respectively, lower than those of either of the ingredients.

First week in Oct, 1903 –
Further determinations of melting-points & sol.-points:
No 4. Outside layer, Mp. 50°C. sharp.
Solid.-p. 47°.5 – 44° C. (Cold looked non-homogeneous because of slow cooling).
No 4. Inside layer. Mp. 50 °C.
Solid.-p. 48°.0 – 44.5 C.

No. 3. Outside layer. Mp: 49°–49°.5C.
Solidif.-point: 46° – 43° C. (perfect opacity ~~was [illegible] at~~ only at a ~~too~~ little lower temp.)

Frank L. Dyer

No. 3. Inside Layer. Mp. 51.5 – 53.5 C.
Solid.-point: 51°.5 – 47° (~~White at~~ turning white very slowly after that, white along bulb of therm. at about 40°C. ~~A~~ similar phenomenon, i.e. a second crystallization, must have taken place also in other cylinders examined, but was missed) –

No. 5. Outside layer, mp. 51°–53°; Solid point: 49° – 47.5 (whiteness much lower)
No. 5. Inside layer

Frank L Dyer 7

M.P. determination [illegible] method:

30 g. S̄ + 20 g. ceresin were melted in a glass beaker and the solidifying point de-termined: the substance began to deposit crystals at 52.5 C., the temperature gradually fell to 45° C., remained stationary at this point, then rose pretty rapidly to 48.5, again remained stationary, then slowly fell to 47°, remained stationary (?), the mass being now in a pasty condition in the center of the beaker and ~~pretty well~~ quite solid all round the sides. At 46.5 the temperature was stationary for a long time. When it was scarcely any longer possible to move the thermometer, the temperature was about 46.~~2~~C. – 45°C.

Further experiments, with superheating done in apparatus like the one described in the patent; mixture was 65% stearic acid and 35% ceresin.

Exp. 1. Apparatus superheated, then the melted mixture poured in, heat maintained for ca. 15 minutes, then ~~a jet of ordinary tapwater [illegible]~~ ~~maintained for ca. 30 minutes~~ rapid

Frank L Dyer

8.

current of cold tap water turned on and maintained until the wax in the mould was solidified inwardly to within a very small distance from the core; mould, core, & wax then taken out, core removed and mould with wax replaced in the cooling jacket, after this the current of cold tap water was maintained for ca. 30 minutes; on careful examination, the wax showed no sign whatever of shrinking away from the mould. It was then kept in melting ice for about 15 minutes and then it was possible to remove the cylinder. The cylinder showed signs of powerful attack of the copper, being of a deep green hue. The cylinder is marked No. 8

Exp. 2. Now the mould & core were gently warmed. The wax was melted on the water bath and introduced into the mould. The mould, core, & wax were placed in the jacket, & the superheating & chilling were carried out as in the preceding experiment. The results were the same as before, except: a. the green

Frank L. Dyer

longitudinally

coloration of the cylinder was not deep; b. the cylinder cracked longitudinally while the mould was in the melting ice. The cylinder is marked No. 9.

Exp. 3. The experiment was repeated for the purpose of obtaining a cylinder that was not cracked. This time there was irregular ~~of~~ cracking in several points, but the cylinder did not break open; it was kept for trial on the phonograph & microscopic inspection. It is marked No. 10. Cylinder No10 was successfully reproduced.

Exp. 4. The ~~two~~ mould & core were then gently heated (to about the temp. of the mixture), the wax melted on the water bath & introduced into the mould. The latter was then chilled on the outside with ice water, the core taken out as early as possible, & the chilling continued until the wax shrunk away from the mould sufficiently for removing. The cylinder is marked No 11. (No jacket used)

Exp. 5. A smooth core was now employed

Francis L. Dyer 10

and an ordinary mould (with thicker shell) was used. The preceding experiment was repeated, with the same result, except that it was a little more difficult to remove the cylinder, the top half of which cracked off irregularly. The cylinder is marked No. 12.

Exp. 6. The same experiment was repeated, with same result. The cylinder is marked No. 13.

Exp. 7. A cast was now made with the regular white-blank composition. The mould and core were heated by a flame, the wax was heated until limpid, introduced into the mould, & ~~at~~ as soon as possible the core was removed; on the application of ordinary tap water to the mould, the wax soon shrank away & was removed. The cylinder is marked No. 14.

Exp. 8. Exp (5) was repeated, again with threaded core and thin mould. Cylinder shrunk away from the mould pretty easily. The cylinder marked No 15.

Francis L Dyer

Exp 9. Experiment (5) was again repeated with threaded core. The cylinder came out entire, without any cracking. It is marked No. 16

Exp 10. Experiment (5) was repeated with a mixture of 75 parts of ceresin and 25 parts of stearic acid. The cylinder came out entire. It is marked No. 17

Exp. 11. A mixture of 65 parts of stearic acid and 35 parts of ceresin were heated at 177° C. (350° F.): no bubbles were given off.

Microscopic Examination of Cylinders 7—17 by Mr. Edison Oct. 12, 1903, who said:

No 7. One part of record fair, other part dull, torn, rough, apparently not filled seems as if gas formed on surface in places. The record has a blue tinge also is cracked.

No. 8. Record very green, lots of gold torn off the mould, surface dull, don't seem

Frain & Dyer

to be well filled; part of a cavity shiny; part dull; looks as if surface was torn.

No. 9. Part of record very blue; cracked whole length; very dull surface; don't look as if it filled everywhere; very poor.

No. 10. Cracked; very bad; dull surface generally; very blue; gold torn off; large patches of record torn and rough; very poor.

No. 11. Some of gold torn off; surface rough; not shiny; has torn appearance over large area; cracked; very bad record; blue tinge.

No. 12. Shows gold torn from mould on bottom end; longitudinal scratches from removing and from mould; surface generally dull; pretty well filled; crack in record.

No. 13. Record with cracks; some torn parts in it; not very shiny; seems pretty well filled; some places show air or gas

Frank L. Dyer

caught

No. 14. Gold torn off mould slightly; a little dull at top end; fills pretty well; looks fair under microscope.

No 15. Cracks in spots; bad surface; torn; not filled in places.

No. 16. Dull surface; green or blue tinge; some parts of area shiny, ~~others~~ dull, with torn appearance; a few specks of gold torn off; cylinder intact, but cracked.

No. 17. Crystallized or torn and rough surface, does not seem to be filled; dull on one side, brighter on the other side in places; chipped, probably stuck to mould in places. Top pouring end very bad surface, bottom better; fairly shiny, but surface ~~torn~~. One inch from bottom the surface is not shiny and is torn.

---

60 g. $\bar{S}$ + 40 g. Ceresin melted, thoroughly mixed; a sample sucked up into a capillary tube, & mp determined; result: 49°–50°C. There may have been incipient melting somewhat

Observation: The mixture was introduced (melted) into ~~alum~~ gently warmed mould, allowed to solidify & then subjected to superheating (i.e. No 18). Same of No. 19.

Granier & Draper

below 49°C., but it only became distinct at 49°C – Solid. p. 45.5 – 44°C (in capillary tube). The solid-point of the same mass in a beaker was as follows: first depositing of crystals at 51.5 or 52°, then gradual fall of temperature to 45°, then gradual rise to almost 49°, remained long stationary at 48.5°, then temperature of paste-like mass gradually fell to about 45°C. The result was thus identical with the one described on p. 7.

+ No 18. D A mixture ~~[illegible] in Expt 1.~~ ~~(p. 11)~~ was cast in ~~[illegible]~~ mould (4917) heated in glycerin bath to 177°C (for some time & then plunged into cold water. Smooth core was closed at the bottom with a cork stopper. The composition of the mixture was ~~[illegible]~~ that (65:35) that had been used in Exp 11 (p. 11). The heating was stopped before all bubbling ceased.

No 19. 91 g S + 49 g er. (= 65:35) were heated as in preceding Experiment, but until all bubbling had ceased. The

core was left open, so that both superheating & chilling were done both from the inside and from the outside. After this the mould was carefully examined under the microscope: it was found to have been badly attacked by the wax.

Analysis:

Residue of wax ~~x~~ from casting No. 19 was melted up and two samples taken in the liquid state, from well mixed mass.

1. Weight of sample A ... 1.0370 g.
2. " " " B ... 1.0095 g.

A thin outermost layer was then scraped away from cylinder No. 19, and weighed as "sample C".

3. Weight of sample C .. 0.7880 g.

Finally, as a check, a sample of stearic acid was taken (Sample D).

4. Weight of sample D .. 0.9935

~~To ex~~ The four samples were then

titrated in alcoholic solution with a ca. 1/5 N. alcoholic solution of KOH and phenol phthalein as an indicator. The numbers of cubic centimeters of alkali required to neutralize the four samples were as follows:

5. Sample A . . . 7.85 cc.
∴ 1g. A = 7.59 cc. alkali
6. Sample B . . . 7.72 cc.
∴ 1g. B = 7.65 cc. alkali
Average ∴
1 g. wax = 7.62 c.c. alkali

7. Sample C . . . . 6.00 cc.
∴ 1g. C = 7.61 cc. alkali

8. Sample D . . . . 11.64 cc.
∴ 1g. D = 11.72 cc. alkali

7.62 is 65 per cent. of 11.72.

Conclusions: 1. The analytical method used is very good and would easily show a difference of 1%; 2. The outside layer of the cylinder is identical in composition.

with the mixture employed in casting the cylinder, and hence a separation of the ingredients is seen not to take place.

Determination of ~~Con~~ Point at which a film can form on the mould.

1. Glass apparatus used (thin walls) with cold water circulating through it and a thermometer attached at ca. 1/16 of an inch. A number of determinations (about 12) gave on an average:
a. Temperature at which film ~~is~~ covers about ½ in. of the glass tube from the bottom: ca. 93°C. (200°F.)
b. Temp. at which film covers entire length immersed in molten wax (viz. 1½ in.) ... ca 65°C. (150°F.)
c. When stirring was employed, the temp. at which ½ in. from bottom was covered with a film was ca. 75°C. (167°F.)

Frank L. Dyer

2. Metal apparatus employed, consisting of a ~~tub~~ brass tube (1/16 in. thick) with water circulating through it and a copper ring about an inch tall and made of 1/16 in. of copper, fitting snugly around the brass tube. In this the conditions are very similar to those of the apparatus described in the patent; the cooling is, on account of smaller dimensions, probably more efficient.

With this apparatus, the ~~heating~~ temperature at a distance of ca. 1/16 in. from the copper ring was found to be ca. 120°C. (248°F.) when the first deposit was formed on copper ring. Above this temp. there was not a trace of deposit formed.

Cylinders for ~~trying~~ testing hardness and resistance to wear by stylus:

No. 20. Commercial brown wax, ~~with~~ mechanically reproduced record.

Wax of Nos. 26—35 has been heated at 200°C. before casting, for the purpose of driving off any impurities that might be present.
Comp.: 65:35 (S + Cer)

No. 21. Same as No. 20.
No. 22. Brown wax cast, when liquid, in gently warmed molds and subjected to very slow cooling.
No. 23. Brown wax maintained in glycerin bath at 177°C. for ca. 10 minutes then suddenly chilled from outside by plunging into ice-water.
No. 24 Blank of brown wax made by Mr. Dodd in the ordinary way.
No. 25. Same as No. 24.

Experiment. Mixture 65 S + 35 Cer. were filtered at 100°C. through Swedish filter-paper.

No. 26. S + Cer (65:35) ~~at~~ cast warm, allowed to cool slowly, when perfectly solid, but somewhat warm, chilled out of mould with ice.
No. 27. S + Cer (65:35), cast at gentle warmth, allowed to cool slowly; when solid & quite cold, chilled out of mould with ice

No. 28. Sudden chilling from about 60°C., water not very cold; when wax was cold, chilled out with ice.

No. 29. Sudden chilling from about 60°C, Ice water.

No. 30 Sudden chilling from about 100°C. Ice water

No. 31. Sudden chilling from about 175°C. Ice water

No. 32. Sudden chilling from about 175°C. Ice water

No. 33. Slow chilling from about 100°C.

No. 34 Sudden chilling from melting point. Ice water.

No. 35. Sudden chilling with ice water from melting point.

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No. 36. Regular white wax, suddenly chilled from about 175°C

Hardness of Mixture of 65 S + 35 Cer. cast into blanks in different ways: & tested with constant weight & Corner. The width of the groove, approximately estimated by inspection under the microscope, was as follows:

1. Cyl. made by slow chilling, average of 3 cylind. . . .0080 in.

2. " " sudden chilling from 60°C., average of 4 cyl. . . .0078 in

3. " " by sudden chilling from 100°C. .0075 in

4. " " " sudden " from 175°C (average of 2 cyl.) . . .0078

Hardness of ordinary composition:

1. Reg. white made by slow chilling . . .0060

2. " " " " sudden chilling from 175°C. 0060

3. Reg. brown made commercially 0060

4 " " " by slow chilling .0060

5. " " " by chilling from 175°C .0080(?)

Conclusion: Mixtures of stearic acid and ceresin are softer than ordinary waxes, and their hardness is not influenced by sudden chilling.

Brown commercial cylinder cast by process described in Macdonald patent ~~was~~ examined as to separation of ingredients (Cylinder No. 2-3):

Weight of Outside layer . . . 1.0720 g.
" " inside " 1.1805

No. of cc. of alcoholic KOH required to neutralize outside . . . 5.15 cc.
Same — inside . . . . 5.50 cc.
∴ 1 g. outside requires 4.80 cc.
∴ 1 g. inside " 4.65
1 g. commercial Stearic acid requires 11.725
∴ Outside contains 40.9% } Practically
Inside " 39.6% } the same.

Attempt to analyze the commercial cylinders made by the Columbia Graphophone Company. — Nov. 1, 1903 —

Sample No. 1, weight . . . 10.0050
(very slight loss occurred at an early stage of the ~~pr~~ analysis).

Sample No. 2, weight . . . 10.0045+
[illegible]

(1) Wt. of Pt. cruc. + lid 50.4780
(2) Wt. of (1) + Al_2O_3 . . . . 50.5205

Al_2O_3 . . . .0425 g.
~~Al~~ or 0.425%

(1) Wt. of Pt Cruc. + lid 50.4775

Coal

Pt cruc. 50.4775

+ sample (4935) 51.9300

sample . . 1.4525

Cruc. + res. (1st weighing) 50.7515

Res. (2nd ") 50.7515

.2740

(18.9%)

~~Porc. cruc. + lid . . . . 23.7680~~

~~+ sample (combined) 25.5710~~

~~sample . . . . 1.8030~~

R

Porc. cruc. . . . . 13.8110 −

− 200

+ sample . . . . 15.3010 −

− 200

Sample 1.4900

+ res. (1st weighing) 14.1025 −

− 200

Res. .2915

(19.6%)

Mean: 19.5%

+ res. (2nd weighing + HNO_3) 14.1000 (19.4%)

[ITEM FOUND IN BOOK]

7 — One part fair other
part dull torn, rough
apparently not filled
Seems as if gas formed a
[illegible]
Record blue tinge,
Cracked -

8 = Record very green
Lots of gold torn off mould
surface dull - dont seem
to be well filled - part of
a cavity shiny part dull
looks as if surface torn

[ITEM FOUND IN BOOK]

9 = part of Record —
Very blue — Cracked color
length — very dull
surfaces don't [illegible]
if it filled every where
very poor — ~~[illegible]~~

10 — Cracked — very bad
dull surface generally
Very blue — gold torn off
large patches off [illegible]
torn through — Very poor

[ITEM FOUND IN BOOK]

11 — Some of gold torn off
Surface rough not shiny
has torn appearance over
large area — Cracked
Very bad record —
One or parts of groove [illegible]
in blue tinge —

12 = Shows gold torn from
mould on bottom end
Longitudinal scratches from
removing of form mould
Surface generally dull
pretty well filled —
Record broken only part
given me — also Crack
in part given

[ITEM FOUND IN BOOK]

13 – Record broken –
only part given me; that
part cracked –
Some torn parts wet –
not very shiny – grooves
pretty well filled
Some places show air
caught –

14 = Cylinder not broken
good form of mould slightly
little dull at top end –
fills pretty well – Microscopy
fair –

[ITEM FOUND IN BOOK]

15 – Only part of record remaining
given me – Cracked in
spots – bad surface –
torn also, not filled in
places

16 – Crystalized or dull surface
green or bluish tinge –
Some areas shiny others
dull with torn appearance
few spots gold torn off –
Cylinder intact but
Cracked –

[ITEM FOUND IN BOOK]

17 = Crystalized surface generally
or may be due to torn surface
Rough surface
Dont seem to be filled
Dull on one side brighter on
other side in places
Chipped - probably a check
to mould in places
Top pouring end very bad
surface - bottom better
fairly shiny but surface
torn one inch from bottom
matching surface torn

Notebook, N-09-01-03

[ITEM FOUND IN BOOK]

Cable Address "Edison, New York."

From the Laboratory of Thomas A. Edison.

Subject, ____________ Orange, N.J. 30/3 1909.

Tell Goldstein = that I cannot judge of the samples that Mr Aylsworth [illegible] probably [illegible] take it up with him

Mr. Thomas A. Edison

Dear Sir

Herewith I beg to submit ~~your~~ kind consideration a few preparations and the results so far obtained in the improvement of records masses.

From the first I applied all possible means in order to impart to the montain wax hardness of glass with sufficient toughness. Partly I succeeded by application of factis from linseed oil and dichloride of sulphur; the last experiments have given results which are 50% better than the regular records.

In order to avoid the disagreeable Sulphur Dichloride I have taken for substitutes for the same and I found that I could get just as good factis by Tinnchloride

The methods although giving good results are too complicated and expensive, and I have therefore looked for cheaper materials among which I found in the Gilsonite the proper thing.

After getting a small autoclave made by Mr. Ott I have treated many waxes and resins under pressure and found that Gilsonite by this treatement changes into easy melting material which mixes with many kind of waxes.

For itself it possesses a certain elasticity and if mixed

[ITEM FOUND IN BOOK]

[ON BACK OF PRECEDING PAGE]

with montain wax to about 30 %, the quality of the records does not suffer in the least.

In order to consume the brittle nature of the Gilsonite, I have mixed with the same the Elaterite, treated in the same way. Elaterite when treted under pressures, changes in such a substance which is absolutly soluble in Benzine and mixes with montain wax in all proportions.

If added in the proportions of 30 %, records are obtaind, which are 20 % better than the regular.

From the samples sent, you will recognize, that Elaterite for itself is too soft, and I have therefore mixed the same with changed Gilsonite, obtaining just as good results.

The cheapeness of the materials and the simplicity of the processe used by me, appear striking enough to ask you for you kind opinion, in the premisses as Mr. Aylsworth is absent and I cannot therefore obtain any information from him

Awaiting your further commands, I have the honor to remain, Sir,

your very obedient Servant

Ignacy Goldstein

chemist.

Notebook, N-10-07-29

July 27 197[illegible]

Experiments on tetranapthalene + Shellac find a chemical to keep the shellac from decomposing

1/2 Tetrachloronapthalen
1/2 Shellac -
Melt Tetra then add the shellac in small lots stiring all the time until all in —

Then add 1/5 more of X — and keep it at a temperature where it is about as liquid as it was before X added

See How long it takes before it goes to a jelly

	Shellac	[illegible]	solvent	Name of solvent	hr run	Temp	Soft	Hard	Brittle	Tough		Remarks
	grams											
1	5	5	2	salicylic acid.	1	110	m ''	m		''		To Much Solvent
2	5	5	''	analine	3	110		m		''		'' '' ''
3	5	5	¼	Phenol		110				''		
4	5	5	2	Ortho Chlor analine	6	110		m		''	ok	looks good
5	5	5	1	Creasote	3	110		m		''		Ng
6	5	5	2	Toluene	1½	110		m	s			Napth excess
7	5	5	2	Napthaline Bichromate	2	110		v		''	ok	
8	5	5	2	'' alpho Mono Nitro	2½	110				''		'' '' ''
9	5	5	2	Xylidine	9	115	''			''		to soft
10	5	5	2	Creasol	1[illegible]	115		v		''		looks good
1	5	5	2	Palmitic Oleic + Stearic acid	1	112					ng	
2	5	5	2	The wax from Shellac	1¼	115		m		''	ok	excess of nap
3	5	5	2	Shellac free from wax	1¼	108		m		''	ok	excess of Nap
4	5	5	2	'' + pure Stearic acid	1[illegible]	110	''		''		ng	dark. Ng
5	5	5	2	Oleinic acid	2	110						
6	5	5	2	Pure Shellac + Common Shellac	2	110		''		''	ok	looks good
7	5	5	2	Palmitic acid	2	110	''			''		Rubbery
8	5	5	2	Stearic acid	2	110		m		''		Waxy
9	5	5	2	anisol	2½	110		m		''	[illegible]	same as 12
20	5	5	2	Cimole	1	110	''			''		
1	5	5	2	ethylene Chloride	1	110	''			''		hard
2	5	5	2	Caproic acid	1	110	''			''		
3	5	5	2	acetal	1	110	''			''	ng	
4	5	5	2	amyloxide Butyrate	1	110						Thin hard
5	5	5	2	ether Formic	1	110						thin very hard
6	5	5	2	'' anthracin	1	110						''

		Remarks	pro Run
27	Cumene	thin	
28	Mono Chloro Phenole	" soft Rubbery	3
29	Methyl oxid Benzoic	" very hard waxy	1
30	eather Benzoic	" " "	1
31	~~Carbon~~ Bichloride	gas comes out	1
32	Phenyl Hydrazine	" " " Ng	1
3	Benzaldehyde	very hard waxy	120
4	atriol	to soft Ng	230.
5	amyl Butrate	very hard tough	130
6	Oxalic eather	soft Rubbery	0.30
7	ext Resin Jalapa	very hard Brittle	.20
8	Oleic acid	" Brittle	1.25
9	ext Kalmia fld.	React that Congelles then melts.	1 1/2
40	acid Palonatic Com	soft No good.	2
1	Fusil Oil. Pure.	very hard	1
2	Urea Carbamid	Coagelates the shellac	ng.
3	Benzoic acid	~~looks good~~ very thin to soft	310
4	ext guiacum	~~very hard~~ " good	210
5	3rd fraction from distillation of anthracene	" " " Brittle	1.20
6	Iron Resinate	~~gobules in it~~ fine try it	1.20
7	acid Chlorocrotonic	soft No good	1
8	" Cresotinic	hard, tough "	1
9	Pottasium Bichromate	Thick hard waxy	1
50	Creasote Oil	thin " "	1
1	Ozokerite	Dont mix good Hard	110
2	Napthalamine alpha	looks good "	
3	Yellow Ozokerite	Dont mix	1
4	Ichthyol	hard	120

asphalt
Nitro Phenol
Succinic acid
Benzyl Chloride
Pitch
sodium Silicate
sealing wax
anthracene
Lead Resinate
Barium "
Magnesium "

		hrs
hard	Dont mix well	13.0
"	same as Shellac	1
hard	No good	30
"	as Shellac	1
"	" "	2
Dont mix	good soft	0.30
very hard	Red.	.25
"	"	.45
		2

	Lead Chloride	Solvent	mix
1	"	Nitroa analine	"
2	"	Napthol alpha	"
3	"	Phenanthren	"
4	"	Resourcine	~~mix~~
5	"	Acetanilid	—
6	"	Benzidine	Mix
7	"	Methylen phenylen amine	—
8	"	Crude Acetoluidine	—
OK 9.	"	Dianisidine	~~Solvent~~
10	"	Phenol tri Bromide	Mix
1	"	Trichloro Phenol	—
2	"	Benzo Phenol	—
3	"	Nitro toluol	—
4	"	Phenylen diamine	mix
5	"	Brethyl Hydroquinone	—
6	"	Napthalene Bichromate	—
7	"	Nitro Phenole	Mix
8	"	amido Phenole	"
9	"	Nitro toluol	—
20	"	Sebacic acid	mix
1	"	Ortho Nitro Para Phenitidine	mix
2		Para Dichloro Nitro Benzol	—
3		Ortho nitro phenole	—
4		Dimethyl Diamido azobenzol	—
5		Flourene	Mix
6		Dichlor analine	—
7		Para Nitro acetanilid	Mix

	substance	Solvent	Mixture	Soluble	
28	Lead Chloride	Ortho toluole sulphonamide			
9	"	azobenzol		No good	
30	"	Amido Phenole	"		
1	"	Anthracene		No good	
2	"	Benzamid	"		" ok
3	"	Ortho Nitro Para toluol		no good	
4	"	Para Nitro Chloro Benzol		no good	
5	"	Diphenylamine		no good	
6	"	Trichloro quinone		no good	
7	"	Carbazol		" "	
8	"	Hexachlorethan		" "	
9	"	Yellow amido azobenzole		" "	
40	"	Mono alpha Nitro Napthalin	"		
1	"	Azobenzole	"		
2	"	Thiocinnamine		soluble	ok
3	"	Para nitro Chloro Benzole	"		
4	"	Nitroanaline ortho	"		
5	"	Trichloro Phenole	"		
6	"	Sulpho Phenyl		No good	
7	"	Dimethyl amino azobenzene	"	"	
8	"	Perchlorobenzol	"	"	
9	"	Heliotropine		"	
50	"	Phenanthrene	"		
1	"	Dinitro Phenol	"		
2	"	Benzo Phenone		No good	
3	"	Nitro Anisol		"	
4	"	Cressotinic acid	"		
5	"	Dioxynaphthalin		No good	

		Soft	Hard	Mix	Sol	No good
56	alpha Naphtha					
7	Benzanilid		—	—		
8	Nitro analin Meta		—	—		
9	Phenylendiamine		—	—		
60	anthra quinone		—	—		
1	Monobromated Camphor		—	—		
2	Phenacetine		—	—		
3	Para amido ortho cresol		—	—	—	
4	Ortho amido Phenol		—	—	—	
5	Nitro Phenol Para		—	—		
6	Para dichlor analine					—
7	Quercitrin					—
8	Paraanisidine					—
9	Mono Methyl Para amido Phenol					—
70	Tetra chlor quinone					—
1	Binitro toluole					—
2	Ortho toluidine	fine try it OK				
3	Nitro Benzoic acid					—
4	amido azo benzine					—
5	amido Phenol Ortho					—
6	" " Para					—
7	Toluenediamine Com.		Hard Mix			
8	Para Nitro Cresol					—
9	Cinchonidine Benzoate				Soluble	
80	amido azo benzole				"	
1	alpha Mono Nitro Naphthaline					—
2	Tetra Methyl di amido di phenyl Methane					—
3	Toluenediamine Meta Com.		Hard mix			

No.	Compound	Hand	Mix	Sol	No good	Remarks
84	Toluendiamine Meta Com					
5	Picric acid	—	—			
6	Dinitro Napthalen	—	—			
7	Benzidine	—	—			
8	" Basic	—	—			
9	Hydro quinone	—	—			
90	Mononitro Napthalene alpha	—			—	
1	Meta toluen diamine	—	—			
2	Phatalic acid				—	
3	Benz phenole				—	
4	Hydro azobenzole				—	
5	Exalgine				—	
6	Methacetin	—	—			
7	Acieta Para Phenylendiamine					OK Soluble fine
8	Haematoxin					
9	Chloro Nitro Benzole Para					Hand mix
100	Di nitro Benzole					
1	Thio Carbamine					fine OK very fine
2	Guandine Carbonato				No good	No good
3	Ortho Nitro Benzaldehyde					
4	" " Chloro Benzole					
5	Acieta Para amido Phenol					The Best try it OK fine
6						
7						
8						
9						
110						

Solvents for
Lead Chloride $PbCl_2$

Ortho amido Phenol
acetparaphenylin diamine best
Ortho toluidine good
amidoazobenzole
Nitra analine Para
aceta Paraamido-Phenole best
Thiocinnamine soft
Dianisidine

Expts Aylsworth Resin
+ Chloride of lead

Resin		Chloride	
	$2\frac{1}{2}$	1	fair
	"	2	better
	"	3	better still
	"	4	better than 3 & 1
	3	5	best
	" ~~+ [illegible]~~	6	to thick
	" + Paranidro PA Scol. 3		best yet
"	"		

" ~~10 to [illegible] Chloride best proportion~~

10 of $PbCl_2$ to 6 of Resin is the best proportion; more Chloride makes it tougher but too thick. Expts to make it thinner by solvents for the $PbCl_2$

Resin	Chloride	
$2\frac{1}{2}$	+ $\frac{6}{10}$ ~~[illegible]~~	No good
$2\frac{1}{2}$	+ 1 g Thiocinnamin + 6 Chloride	No good

10 $PBCl_2$ 6 Resin

1 gram of acetanilid
makes 18 ~~Chloride~~ to 20 of ~~Chloride~~
better than 2½ to 1 " that
dont have the acetanilid
^Resin^ in.

Japan wax + Shellac No. 9

aug 25 1910

gave to Petit to put on some forms

Resin asylwoth. PB Cl2
108 grm 180

found that Phenol is the proper volatile solvent to use for preventing the Resin from becoming thick and the thickening is due to (the) evaporation of the phenol in the Resin try more 10-6 and maybe more Chloride thinning it with Phenol some fair Records made of it heating makes it hard and tough.

Experiments
J.W.a.

PBCl2 grams	Resin grams	Phenol grams
1	5	
2	5	
3	5	
4	5	
5	5	
6	5	
7	5	
8	5	
9	5	
10	5	
11	5	
12	5	
13	5	
14	5	
15	5	
16	5	
17	5	
18	5	
19	5	
20	5	
21	5	
22	5	
23	5	
24	5	
25	5	

liquid

best Solvents $CaCl_2$

1 acetylene tetra Chloride
2 Phenetol
3 Bichlorobenzol
4 Isobutyl Xylol
5 Nitro Xylol Para
6 " " Meta
7 Monochloro toluol
8 Perchlorethylene
9 Methyl ethyl Ketone
10 Picoline
11 Monomethyl analine
12 xylol ortho com
13 Xylidine meta
14 " only
15 " Para
16 Nitrotoluol ortho
17 Methyl Benzamine
18 Ortho phenetidine
19 Dichlorohydrine alpha
20 Xylidine Para
21
22 second best
23 Monochlorohydrine
24 Tricresol
25 Monoethyl Para toluide
26 Ortho Chloraniline
27 Nitro xylol ortho

No Good for Solvent

28 Eugenol Iso
29 Creasote
30 Trichforethan
31 Para Phenetidine
32 Monoethyl toluidine
33 Methylate
34 Anisol
35 Aniline
36 Hypnon
37 Nitro toluol
38 Mono Chlor Naphthaline
39 Dimethyl aniline
40 Diethyl aniline
41 Toluidine Ortho
42 Methyl & D Ephinylamine

Experiments to free the Phenol Resin by boiling with a Solvent to displace the Phenol.

Solvents	Remarks.
Methyl Ethyl Ketone	
Nitro Xylol	
Mono Chloro benzol	
Isobutyl Xylol	
Nitro Anisol	Ortho Com.

It seems that J W A
the Old man are working
on a Bakelyte that is made
with a Volatile Solvent
that take the place of
Phenol in the CH_2O
Reaction. Therefore
the Can mix a filler
in this evaporate the solvent
make a plastic dope
then press the Record and
every thing is tough as
hell -

Notebook, N-10-11-19

all Run at 1000 speed up to No 34

Reg Mix 37½ shellac
12½ tetra
15 asbestos — through 60 mesh

No-1 heat mix to 284 F mold 280 F
asbestos warmed in oven before mixing
weight of Record 39 g speed 1500

No 2 Dup of No 1 except mix heat to 311
No 3 " " " 300
weight of Record 44.5
No-4 Dup of No 3 - Weight of Record +9 g

No-5 Mix for end rings 112½ shellac
speed 1500 37½ tetra (300 F)
45 asbestos

Poured at 300 mold 290
Stuck in mold -

No-6 Had mold Nickelplated
Mix for end rings 112½ shellac
speed 1500 37½ tetra (300 F)
45 asbestos

Weight of Blank for end rings 110.5
for small end

No 7 mix for Large end rings 56½ shellac
speed 1500 18¾ tetra
Asbestos not screened 22½ asbestos
Weight of Blank for end rings 74.5 (300 F)
for Large end

Weight of small end ring ~~[illegible]~~ 110 g
out side 2/32 — 11/16 inside

Time for pressing rings in mold
65 sec Ring 55 sec

Ring oven 210 F

Ring mold 280 F

No-8 temp. for Mold 290. Mix 300
No-9 " " 300 " 310
No-10 Dup of No 9 except new Mold to try
and see if the record will extract with out
pulling

No 9½ 37.5 Shellac 12.5 tetra 15 asbestos
2.5 Dichlorohydrine Alpha — speed 1500
Hard to extract from molds
Mold 300 Mix 300

No-10 Dup of 9 Except Mold 280 + Mix 280

Reamed to hot

~~No 11 Dup of 10~~

No- 11 Expt for contraction
Shellac 45 g tetra 15 g - 4" Dichlorohydrine alpha - No 60 mesh Asbestos - Let lay on ice 14 hrs all night could not extract it. on cracked ice + salt 1 hr came out of mold hard
Mold 280 Mix 280

Cold test on Records

2 Records with straight 3/32 taper paper cores - marked 1 + 2

2 Records with 3/32 straight paper cores with paper rings in ends - marked A + B

1 - 2 - A + B were put on ice test and did not show any cracks at 4° below zero. Then they were put in Carbonic Acid test
#1 cracked after 30 min at - 40 below zero
" 2 " " "
" A did not crack at 40 below
" B " "

Same Records on hot test at 110° F - 2 that layed down flatened the two that stood up warped out of shape - the mix was 37 1/2 shellac - 12 1/2 tetra - 15 Asbestos. Reg.
Molds 280 F Mix 280 F

~~No. 12 Cap for contraction~~
~~Shellac 37½ tetra 12½ Asbestos 15~~
~~Dichlorohydrine alpha ½ cc~~
~~Revolved on ice 5 min. did not contract~~
~~enough then in crackerice & water 5 min~~
~~still stuck fast. mold 300° Time 300~~

No. 13 for contraction
Shellac 37½ tetra 12½ Asbestos 15
Dichlorohydrine 2½ cc

#12 Experiment for contraction
Shellac 37.5g. Tetra 12.5g. dry Asbestos 60 mesh 15g
Dichlorohydine Alpha 1½ CC worked on
Ice 5 minutes did not contract enough to
Come out then put in cracked Ice +
salt 5 minutes still stuck fast could
not pull it out took molds and hit
it on end and jarred it and then it
Came out but to close did not shrink
enough draged on side of molds
Temperature of molds 300F mix 300 F

#13 Experiment for Contraction
Shellac 37.5g Tetra 12.5g dry Asbestos 60 mesh 15g
Dichlorohydrine Alpha 2½ CC
put molds on Ice 5 minutes then took
molds and jarred it on end and then it
Came out but not shrink enough cylinder
draged on side of molds
Temperture of molds 300F + mix 300 F

#14 Exps for contraction 60 mesh
Shellac 37.5g Tetra 12.5g dry Asbestos 15g
Temperture of molde 300 F Mix 300 F
Put on Ice 5 minutes then forced molde on end
and it came out but end of record stuck to
end of molde.

#15 Exps for Contraction
60 mesh
Shellac 42.5g Tetra 7.5g dryed Asbestos 15g
Temperture of molde 280 F Mix 300 F
Put on Ice 5 minutes came out some
easied then #14

Rate 15 shellac tetra 4 asbestos 12

Rate shellac 15 tetra 5 asbestos 12 chalk 15

Disk

16

Shellac 156 g Tetra 50 g asbestos (60 mesh) 60 g
Poured out on glass

Disk

#17
Shellac 120 tetra 32 asbestos (60 mesh) 96

Disk

#18
Shellac 90 tetra 30 asbestos (60 mesh) 72
Chalk 90 - could only get 45 of the chalk in then it was so stiff I had to take it out of pan with a spatahular and press it down with flat peice of glass

15 shellac 3 Tetra 10 asbestos

shellac 15 Tetra 5

J.W.A. Resin 37.5 Tetra 12.5 Asbestos 15

Disk

#19 60 mesh

shellac 120 Tetra 24 Asbestos 80

Disk

#20

shellac 135 Tetra 45

Disk

#21 60 mesh

J.W.A. Resin 150 Tetra 50 Asbestos 60

shellac 37.5 Tetra 12.5 asbestos 15
flour of sulphur 10%

"Disk

#22

shellac 150g Tetra 50g Asbestos 60g (60 mesh)
flour of sulphur 26g

Through 60 mesh

#23 - Shellac 45g Tetra 12g Asbestos 36
Binitrotulol - Mold 300 Mix 310
on ice 5 min - had to pare it to get it out

Through 60 mesh

#24 - Shellac 45g Tetra 9.g Asbestos 36
Binitrotulol 6g - Mold 300 Mix 310
on ice 5 min - had to pare and pull
to get it out

Through 60 mesh
#25 - Shellac 45 Tetra 12 Asbestos 36 g
Paraformaldehyed 3 cc. Mold 300
Mix 310 on ice 5 min had to jar then
pull to get it out

Through 60 mesh
No 26 - Shellac 45 g Tetra 9 Asbestos 36
Paraformaldehyed 6 cc - Mold 300 - Mix 310
Could only get 1/2 Record the Paraformaldehyed
made it swell up so it cant be poured
had to jar mold to get record out

N G

#27 - Shellac 45 g tetra 12 g asbestos 36 g Through 60 mesh
Diaminidin Base 3 g to thick wont flow
" makes it condense

N G

#28 - Shellac 45 g tetra 9 g Asbestos 36 g Through 60 mesh
Diaminidin 6 g N.G.

60 mesh
#29 - Shellac 45 g tetra 12 g Asbestos 36 g
Nitroanisol Para 3 g Mold 300 Mix 310
had to pry it to get it out
on ice 5 min

through 60 mesh
#30 - Shellac 45 g tetra 12 g Asbestos 36 g
Nitroanisol Para 6 g. Mold 300 Mix 310
on ice 5 min had to pry it - hard pulling
to get it out record is quite soft

#31 Java. Resin

Resin 56.25g Tetra 18.75g Asbestos 22.5 60mesh
Molds 300 F Mix 320 F pulled out hard

#32
Java Resin
Resin 56,25g Tetra 18.75g Asbestos 45g
Molds 300 F Mix 320 F pulled out hard

#33
Iwa Resin
Resin 56.25g Tetra 18.75g Asbestos 56.25 g
Mold = 300 mix 330 pulled out hard

34- Dup of 33 except Mold 310
mix 350 on ice 5 min pulled out
hard

#35 - 37 1/2 Shellac 12 1/2 Ctra 15 asbestos
Speed of Lathe increased from 1500
revolutions to 1800
on ice 5 min came out eaiser than
any so far temperature of molds 230 F
mix 310 F

#36 Dup of 35 - dropped out after
slightly faring
temperature of molds 230 F mix 310 F

Speed 1800

37- Dup of 35- tried to press mold with finger on one side to see if the shrinkage could be felt then turned mold up and Record dropped out temperature of molds 230 F mix 310 F
Speed 1600

38 Dup of 35 except after seaming put on Vacuum did not come out, had to put on Ice then came out fair
temperature of molds 230 F mix 310 F
Vacuum Collapsed the record
Speed 1600

39 Dup of 35 except put on Vacuum when just warm did not come out put on Ice came out fair
temperature of molds 230 F mix 310 F
Speed 1800

40 Dup of 35 except put in cold jacket until cold then put on Vacuum did not come out put on Ice 5 minutes came out fair
temperature of molds 230 F mix 310 F
Speed 1800

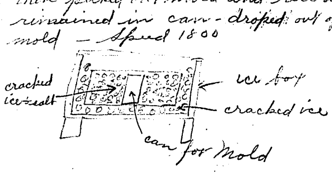
41 Dupe of 35 Except after four minutes put on Vacuum did not come out forced molds hard on end then came out slightly collapsed temperture of molds 230 F mix 310 F Speed 1800

42 Dup of 35 Except after 2½ minutes put on Vacuum did not come out put on Ice for 5 minutes then came out fair temperture of molds 230 F mix 310 F Speed 1800

43 Dup of 35 Except after one minute put on Vacuum to soft Collapsed on one end
temperature of molds 230 mix 310 F
Speed 1800

44 Dup of 35 Except made in regular way molds 230 F mix 310 F put on Ice 5 minutes and it dropped out mix stuck to caps of molds
temperature molds 230 F mix 310 F
Speed 1800

#45. Took regular mix + regular way of spinning Record put Mold in can that was packed in salt and cracked ice after 5 min. took mold of of can record still remained in mold tried it again at 15 min still stuck in mold then let it go 40 min. Then picked out mold and record remained in can - droped out of mold - Speed 1800



46 Dup of 45 Except cooled on ice 5 min then in the can for 5 min. in taking the mold out it was slightly jared and record droped out
Speed 1800

#47
Dup of 45 Except 4 min. on ice 5 min in
can a very slight jare and it droped
out. in the following experements a
peice of copper is put betwen can and
mold to conduct the cold to the mold

Speed 1800  copper strip

#48 Dup of 45 Except 3 min on ice 5 min in
can a very slight jare and out it droped
Speed 1800

#49 Dup of 45 Except 2 min on ice
5 min in can - a slight jare and it
droped out Speed 1800

#50 Dup of 45 Except 1 min on ice 5 min in
can droped out by slightly jaring
Speed 1800

#51 Dup of 45 Except 1/2 min on ice 5 min in can slight pare - OK spud 1600

52 Dup of 51 - OK spud 1800

#53 Dup of 45 except 15 min. in can
did not come out free Speed 1800

#54 Dup of 45 Except 1/2 min on ice and 4 min
in can did not shrink enough - speed 1800

#55 – Dup of 45 Except 1 min on ice 4 min in
can slight jare droped out OK – speed 1500

56 Dup of 45 Except 1 min on ice 3 min in
can slight jare droped out OK – speed 1000

#57. Dup of 45 Except 1 min on ice 2 min in can slight fare droped out OK - speed 18[illegible]

58 Dup of 45 Except 1 min on ice 1 min in can slight fare droped out OK - speed 1800

#59- Reg. shellac mix - Shellac 37½ g tetra 12½
Asbestos 15. mix run in mold ~~after~~
mold revolved 2 min the 50 g regular
record wax run in for a backing
then mold put on ice for 1½ min
then in can 2 min droped out with
a slight jar - Sped 1800

60 Dup of 59 Except 25% asbestos added to
to the record wax. both inner and outter
walls cracked shellac had not flowed
the full length of mold - mold not
hot enough - the amt. of shellac mix used
in the record was ⅔ of what was used
in No 59
Most of the Asbestos settles out
of wax - Sped 1800

#61 Dup of 60 Except 10% asbestos-
shellac and Record wax cracked - sped 1800

#62 Dup of 60 Except 100% asbestos - shellac
and record wax cracked - sped 1500

#63. Dup of 59 Except 2/3 the amt of Reg shellac mix used - record wax cracked
75 g Record wax at 220° F - speed 1800

64 Dup of 63 Except 60 g. Record wax not enough wax was slightly shrunk away shellac on cooling - speed 1800

#65 Shellac 25 g tetra 8 1/3 g asbestos 10 g Regrate
70 g Record wax with 5% chalk mold
was not hot enough to allow the shellac to
run the full length of mold left out
on window sill 1 hr droped out not
cracked - Speed 1800

#66 Shellac 25 g tetra 8 1/3 g asbestos 10 g spun
for 2 min then 70 g record wax with 5%
chalk run in then reamed to right size
then cooled on window sill 10 min temp 40°
then in can 2 1/2 min droped out
Record wax slightly contracted from shellac mix
Speed 1800

Record wax 220

#67 shellac 25 tetra 8 1/3 asbestos 10 spun 2 min
then 75g record wax with 10% chalk run in
then reamed to right size then cooled on ice
untill the record wax fells cool inside the
mold, cracked on ice - Speed 1800

"68 Dup of 67 Except 15% chalk in Record
wax come out easily by cooling on
ice did not crack - Speed 1800

1/2 Deg cut of [illegible]

#69 shellac 18 3/4 tetra 6 1/4 Asbestos 7 1/2
come out on ice OK - sped 1800
Backed with record wax + 15% chalk

cold test

wax cracked at 30° F
Shellac " 40 F or 40 C
taken out in room

#70 Shellac 18 3/4 tetra 6 1/4 Asbestos 7 1/2
Backed with record wax 20% chalk - wax poured 1 min
after shellac mix had been poured, reamed
and allowed to cool before putting on ice
on ice 1/2 min come out OK
did not have a good surface possiable poured
wax to quick - speed 1800

No-71 Dup of 70 Except poured record wax 1/2 min after pouring shellac mix - speed 1800 come out OK on ice allowed it to cool before putting on ice
70 g record wax not enough
Cold test
wax cracked at
Shellac OK at 56°F or 49°C
in 1 hr

#72 Dup of No 71 Except used 100 g record wax reamed out 37 g record wax - speed 1800 came out OK

40% of the original mix

#73 Dup of 71 Except 25% chalk come out
OK on ice speed 1800

Cold test

30 { Put in box at 58°F or 50°C.
reading every ten min 37C or 34.6F
" " " 48C 54.2 "
" " " 55 67. "
OK after 30 min no cracks

#74 Shellac 15g tetra 5 Asbestos 6g backed
with record wax with 25% chalk
Shellac mix did not run the full length
of Mold - Lathe was set level - speed 1800
on ice out OK

Record wax

75 - Dup of 74 Except poured at 200 and 2 min after the shellac had been poured funell for shellac mix not held so far in mold while being poured - sped 1800 not enough shellac mix to fill mold

76 Dup of 75

No-77 - Shellac 18 3/4 tetra 6/4. Asbestos 7 1/2
Asbestos had been run through rolls
8 times rolls was set at .006 then ground.
Shellac mix 310° - record wax with 25%
asbestos 220° - speed 1800
[illegible] cooled in the open air droped out
OK funnel not cleand from the
reg. mix

No 78 - Dup. of 77 Ecept funnel cleand

#79 Shellac 18 ¼ g tetra 6 ½ asbestos 7 ½
record wax with 35% chalk - speed 1800
come out OK in cold air

cold test

wax cracked
Shellac OK at -48° C or 54.2 F
after 1/2 hr

#80 Dup of 79 - Except 35% chalk in Record wax

cold test

Put in temp 60°C or 76 F
for 30 min did not crack.

Fot surface

81 Shellac $18\frac{3}{4}$ titra $6\frac{1}{4}$ Asbestos $7\frac{1}{2}$
mold 335 mix 310 speed 1500

82 Dup of 73

Cold test
In ice box 10 min then in CO_2 ½ hr
In at 68.8°F
out " 76.
slightly cracked when taken out

~~Cold Test~~
~~#69 - wax cracked at 30°F~~
~~Shellac " 40°F~~

83 Dup of 73
Cold test
In ice box 10 min then in CO_2 1/2 hr
Put in CO_2 at 76°F
out " at 58°F
slightly cracked

#84 Dup of 73 Except ribbed

Cold test

In ice box 10 min then in CO_2 1/2 hr
Put in CO_2 at 58.° F
Out " " 56° F
Did not crack

85 Dup of 84"

Cold test

In ice box 10 min then in CO_2 1/2 hr
Put in CO_2 at 58.° F
Out " " 56.2° F
Did not crack

86 shellac 18 3/4 terra 6 1/4 asbestos 7 1/2
mold 335 mix 310 record wax 25 chalk
280 Had to force mold to get it out
stuck Black wax shrunk away from
shellac - speed 1800

87 shellac 18 3/4 terra 6 1/4 asbestos 7 1/2
mold 335 mix 310 Black wax 20
shrank away from shellac had to get out
of mold - speed 1800

88 Dup of 86 Except speed 900 instead of 1800
come out easily but surface bad
Block wax shrunk away from shellac

#89 Shellac 18 3/4 tetra 6/4 asbestos 7 1/2
mold 340 wax 280 shellac mix 310
Speed 1800 stuck fast in mold had to dissolve some of it out
record wax had 40% chalk - wax shrunk away from shellac

#90 Shellac $18\frac{3}{4}$ tetra $6\frac{1}{4}$ Asbestos $7\frac{1}{2}$
mold 300 Shellac mix 310 wax 220 with
25% chalk speed 2100 had to put it in
can salt + ice to get it out of mold wax shrunk
away from shellac surface bad

91 Shellac $18\frac{3}{4}$ tetra $6\frac{1}{4}$ Asbestos $7\frac{1}{2}$
mold 300 mix 310 wax ±20 with 25% chalk
wax was poured immeaditly after pouring
shellac speed 1600

#92 Dup of 91 Except 30% chalk in Black wax

#93 Reg shellac [illegible] poured very slowly for surface not good did not run the full length of mold

94 Dup of 93 Except poured twice as fast
not a good surface

#95 Dup of 93 Except poured three times as fast
surface ng

#96 Shellac 22½ 7½ tetra ¾ zinc sterate
Asbestos 11 for surface - punk

#97 Dup of 96 Except 1/2 g zinc sterate
surface punk

#98 Shellac $18\frac{3}{4}$ tetra $6\frac{1}{4}$ Asbestos $7\frac{1}{2}$
naphtylamine 1 g poured at 290
surface NG

#99 Dup of 98 Except 1g Benz Phenol
Surface NG Mix 290 Mold 300

#100 Dup of 98 Except 1g Dimethylamidoazo.
benzol purified. Mold 300 mix 300
Surface NG.

#101- Dup of 98 Except 1g Dichlor anilin Com'l
Mold 300 Mix 300 surface not very good
some improvement

#102 Dup of 98 Except 1g Phenanthren cp
Mold 300 Mix 300 surface N G

#103 Dup of 98 Except 1g Ortho toluol-sulphamido surface little improvement mold 300 mix 300

#104 Dup of 98 Except 1g Acet para Phenyl-endiamine mold 300 mix 300 Contains air surface

105 Shellac $18\frac{3}{4}$g Tetra $6\frac{1}{4}$g Asbestos $7\frac{1}{2}$g
Nitrobenzal 1. C.C. speed 1750
surface N.G. soften compound

106 Shellac $18\frac{3}{4}$g Tetra $6\frac{1}{4}$g Asbestos $7\frac{1}{2}$g
Speed 2400 did not take the air out
Surface N.G.
Temperature of molds 300 F. Mix 310 F.

Asbestos 1/4 short

Asbestos 1/2 out

#107 Shellac 37 1/2 g tetra 12 1/2 Asbestos 11 1/4
Mold 300 mix 310 - Speed 1800
Surface not good

#108 Dup of 107 Except 7 1/2 Asbestos
surface punk

Asbestos 3/4 out

#109 - Dup of 107 Except 3 3/4 g asbestos
Surface N G

108 Dup of 107 Expt no asbestos
Surface N.G.

#111 Shellac 37,5' tetra 12 1/2 Asbestos 15c
Asbestos put in tetra before shellac
Bad surface Speed 1800

#112 Dup of 111 Except 7 1/2 Asbestos
Bad surface

113 Shellac 37½ g Tetra 12½ g no Asbestos
melted very slow and poured at 250.F.
Molds 300 F put funnel in oven to
get same temperture as molds
surface fair

114 shellac 37½ g Tetra 12½ g Asbestos 15 g
mix 310 F molds 300 F funl warmed in oven
surface not very good

115 shellac 37½ g Tetra 12½ g Asbestos 15 g
mix 250 F molds 300 F funnel warmed in
oven mix to thick did not pour well
surface N.G.

#116 shellac 37½ g Tetra 12½ g Asbestors 7½ g
mix 310°F Molds 300°F funel warmed in oven
surface N.G.

#117 Shellac 37.5 g Tetra 12.5 g Asbestors 7.5 g
mix 250°F Molds 300 F funel warmed in oven
mix to thick did not pour well
surface not good

#118 Shellac 37.5 g Tetra 12.5 g Asbestors 15 g
melted tetra then put in asbestors funel warmed in oven
mix 310°F Molds 300°F
surface not good

119 shellac 37.5g Tetra 12.5g Asbestos 15g
Mix 310°F Molds 300°F warmed funel in oven
poured it from one End did not flow to
End of molds surface not good

120 shellac 37.5g Tetra 12.5g Asbestos 15g
Mix 330°F Molds 300°F funel warmed in oven
stuck to molds

121 shellac 37.5 Tetra 12.5g Asbestos 15g
Mix 320°F Molds 300°F funel warmed in oven
stuck slightly to molds

#122, 123 + 124 Exp for running true

#125, 126, 127 + 128 Exp. for Blow holes

#129 Shellac 18 3/4 tetra 6 1/4 no asbestos
Ex for playing surface

130

Regular 4 minute record wax blank — weight 73 g
Coated with shellac & Tetra Zinz — " 18g shellac
15g shellac
5.5g Tetra
1/2 g stearate Zinz

131

Reg 4 min record wax 20% Chalk — weight 81.5 g
Coated with shellac + Tetra Zinz — " 18g shellac
15 g shellac
5.5 g Tetra
1/2 g Stearate Zinz

132

Reg 4 min record wax 40% Chalk — weight 86. g
Coated with shellac & Tetra Zing — " 18g shellac
15g shellac
5.5g Tetra
½ Stearate Zing

133

Reg 4 min record wax 15% Infusorial earth &c — weight 75g
Coated with shellac & Tetra Zing — " 18g shellac
15g shellac
5.5g Tetra
½ g Stearate Zing

#134.
Reg 4 min record wax 7% Infusorial earth teo   weight 73 g
Coated with shellac + Istria Zinz   " 18 g shellac
15 g shellac
5.5 g Istria
½ g Stearate Zinz

135
Reg 4 min record wax 40% Talcum powder   weight 89.5 g
Coated with shellac + Istria Zinz   " 18 g shellac
15 g Shellac
5.5 g Istria
½ g Stearate Zinz

#136

Reg 4 min record wax 20% Talcum powder   weight 81.25 g
Coated with shellac + Tetra Zinz   ", 18 g shellac
15 g Shellac
5.5 g Tetra
½ g Stearate Zinz

#137

Reg 4 min record wax blank   weight 73 g
Coated with shellac tetra + asbestos   ", 18 g shellac
37.5 g Shellac
12.5 g Tetra
15. g Asbestos screened through 60 mesh

#138

Reg 4 min record wax 20% Chalk — weight 81.5 g
Coated with shellac tetra + asbestos — " 18 g shellac

37.5 g Shellac
12.5 g Tetra
15 g Asbestos through 60 mesh

#139

Reg 4 min record wax 40% Chalk — weight 86 g
Coated with shellac tetra + asbestos — " 18 g shellac

37.5 g Shellac
12.5 g Tetra
15 g Asbestos through 60 mesh

#140

Reg 4 min record wax 15% Infusorial earth tic weight 75 g
Coated with shellac tetra + asbestos " 18 g shellac

37.5 g Shellac

12.5 g Tetra

15 g Asbestos through 60 mesh

#141 all cracked

Reg 4 min record wax 7% Infusorial earth tic weight 75 g
Coated with shellac tetra + asbestos

37.5 g Shellac

12.5 g Tetra

15 g Asbestos through 60 mesh

#142
Reg 4 min record wax 40% Talcum powder weight 87.5 g
Coated with shellac tetra asbestos 1.18 g shellac
37.5 g Shellac
12.5 g Tetra
15 g Asbestos through 60 mesh

#143 all spoiled in putting on shellac
Reg 4 min record wax 20% Talcum powder weight 81.25
Coated with shellac tetra + asbestos "
37.5 Shellac
12.5 g Tetra
15 g Asbestos through 60 mesh

#144 record open then
Reg 4 min wax put in molds and pressed to 1800 lbs
to square inch

#145
Duplicate of #144

56 – 446 (8 –
448

36) 446 (12
36
86

13) 446 (34 –
39
56
52

8 – to lb [illegible]
12 to lb Chalk –
34 to lb Lac. 18c lb

12 – 7
60
4)70
17

106 – 446 (4.2.
424 0
22

15

92
36
56

92 00
4
36
3

446
1

56

8c

#145 - 146 - 147 - 148 - 149 + 150 Shellac 37½ g
12½ g tetra 15 g Asbestos 1.25 Zinc
sterate 4 min Record was had 40% Chalk)
weight of Blank before coating with shellac
Before Coating

145 –	91.8 g	after coating	106.5	dif.	14.7 g
146 –	93.5 g	"	106.5	"	12.7 g
147 –	93.7 g	"	107.1	"	13.4 g
148 –	91.3 g	"	103.2	"	11.9 g
149 –	93.3 g	"	106.7	"	13.4 g
150 –	92.2 g	"	105.1	"	12.9 g
				6	79.0
				Average –	13.16

No. 150 had 500 lb pressure
" 148 " 500 "

Blanks made in 2.137 dia. mold

#151-152-153+154 Reg Record wax

151-152-153 had 1800 lbs when pressing
154 had 1000 lbs

No 155, 156, 157, 158, 159 + 160 Blanks was made of Raw Montan wax with 40% chalk and coated with Shellac 15g titra. 5g + zinc sterate ½ g
All cracked when pressed in mold except No. 156

weight of Blank before coating		after coating	
# 155	93.5g	104.6	difs 11.1
156	94.4 "	105.7	11.3
157	92.5 "	104.9	12.4
158	92.9 "	105.5	12.6
159	94.4 "	106.0	11.6
160	93.7 "	106.1	12.4
		6	71.4
		Average	11.9

No-161, 162, 163, 164, 165 + 166 Blanks
was made of Raw montan wax with
20% chalk and coated with, shellac 15g
tetra 5 and zinc sterate 1/2 g
All cracked or small checks except no 164
weight of Blank before coating, after coating

no-161 -	86.2 g	96.9 g	dif. 10.7 g
162 -	83.4 "	95.7 "	12.3 "
163 -	82.1 "	96.4 "	14.3 "
164 -	84.1 "	96.9 "	12.8 "
165 -	85.4 "	97.4 "	12.0 "
166 -	86.5 "	99.2 "	12.8 "

6 | 74.9
Average 12.48

No 167, 188, 169, 170, 171 & 172 Blanks made from 2 min Record wax 40 % chalk coated with shellac 15 tetra 5 zinc sterate 1/2
Shellac dope did not coat very good on wax blanks, surface of wax to oily

weight of Blank before coating		after coating	dif.
No. 167 -	91.4 g	104.9 g	13.5 g
168 -	89.7 "	104.6 "	14.9 "
169 -	89.7 "	102.7 "	13.0 "
170 -	91.1 "	105.1 "	14.6 "
171 -	91.5 "	102.6 "	11.1 "
172 -	91.1 "	105.1 "	14.1 "
			6 / 81.2
		Average	13.53

#173, 174, 175, 176, 177 + 178 - Blank made from 2 min Record wax 20% chalk, coated with Shellac 15 tetra 5 Zinc sterate 1/2 - Shellac did not coat very good surface of wax Blank to oily

weight of Blank before coating		after coating	dif=
No 173 -	82.9 g	95.0 g	12.1 g
174 -	82.6 "	94.8 "	12.2 "
175 -	83.1 "	96.9 "	13.8 "
176 -	83.7 "	97.8 "	14.1 "
177 -	81.9 "	95.9 "	14.0 "
178 -	83.3 "	97.0 "	13.7 "

6 / 79.9

Average 13.31

#179, 180+181 - 4 min, wax 7% Cotton Flock
Speed of Lathe 540 - Drop test - 14 inches
cracked on second drop, used No-179 for
Drop test
No-180+181 to be Coated with shellac mix
Shellac 15 tetra 5 zinc sterate 1/2 and
put on cold test
Blanks warm when coated
Cold test. 39 below zero. OK

#182, 183+184-4 min wax 5% Cotton Flock. Speed
of Lathe 540 - Drop test - 14 inches, cracked on
fourth drop. No 182 Blank used. 183+184 to be
coated with shellac mix and put - cold test
Blanks warm when coated
Cold test, 39 Below Zero - Records OK

#185, 186 + 187 - 2 min wax 7% Cotton Flock
Speed 540, drop test 14 inches - slight
crack at 25 drops then run it up to 34
times before it cracked full length of record
used No 185 Blank for test, No 186 + 187 to be
coated with shellac on put on cold test
Blanks Cold when coated
Did not coat very good when warm to oily
Cold test 39 Below zerow. Records OK

#188, 189 + 190 - 2 min wax 5% Cotton flock
Speed 540 drop test 14 inches - very slight
crack on end sixth drop No-188 Blank
used for test. No 189 + 190 to be coated with
shellac and run on Cold test
Blanks cold when coated
Cold test Records OK at 39 Below zerow

7% cotton flock

#191, 192 + 193 - ½ 4 min wax ½ 2 min wax
Speed 540 drop test 14 inches cracked at
27 drop - No 191 Blank used for drop test
No-192 + 193 Blanks to be coated with shellac &
and put on cold test
Blanks coated when cold
Records OK at 39 Below zero

#194, 195 + 196 - ½ - 4 min wax ½ - 2 min wax
5% Cotton flock - Speed 540 - drop test 14
inches cracked at 19th drop No 194 Blank
used for drop test No-195 + 196 Blanks to
be coated with shellac an put on cold
test
Blanks coated when cold
Records OK at 39 Below zero

#197 - 4 min wax 7% wood pulp Speed 540
drop test 14 in cracked at second drop

6 Blanks No 198, 199, 200, 201, 202 + 203
4 min wax 10% wood pulp. temp 310
Speed when spinning 1460 - used No 203 on
drop test hight of drop 14 inches cracked at
fith drop

4 Blanks No 204, 205, 206, 207
4 min wax 7% wood pulp Speed when spinning
1460. Drop test 14 in cracked at third drop
No - 204 Blank used for test

4 Blanks No 208, 209, 210 + 211
4 min wax 5% wood pulp Speed when spinning
1460 - Drop test 14 in Cracked at second
drop No 211 Blank used for test

4 Blanks No 212, 213, 214, 215
4 min was 10% Cotton Flock Speed when Spinning 1460 Drop test 14 inches cracked slightly inside at 16th drop cracked outside at twenty first drop No 212 Blank used for test

4 Blanks No - 216, 217, 218, 219
4 min was 7% Cotton flock - Speed when Spinning 1460 Drop test 14 inches very slight crack on inside at fith drop No 217 Blank used for test

4 Blanks No. 220, 221, 223, 224
4 min was 5% Cotton Flock - Speed when spinning 1460 Drop test 14 in. slight on fourth drop No 220 Blank used for test

4 Blanks No 225, 226, 227, 228
2 min wax 10% wood pulp Speed when Spinning 1460 temp 360 Drop test 14 in slight crack at fourth drop No 225 Block used for test

4 Blanks No 229, 230, 231, 232
2 min wax 5% wood pulp - Speed when spinning 1460 Drop test 14 in Cracked on first drop No 229 Blank used for test

4 Blanks No 233, 234, 235, 236
2 min wax 7% Cotton flock - Speed when spinning 1460 - Drop test 14 in. Chipped a little on end at 43rd drop - No 233 Blank used for test

4 Blanks No 237, 238, 239, 240
2 min wax 5% Cotton Flock. Speed when spinning 1460. Drop test 14 in. - slight crack on end 12th drop No-237 Blank used for test

4 Blanks No 241, 242, 243, 244 10% wood pulp
½ - 4 min wax + ½ - 2 min wax - Speed when spinning 1460 Drop test 14 in ~~slight~~ crack on end at sixth drop - No 43 Blank used for test

4 Blanks No 245, 246, 247, 248
½ - 4 min wax ½ - 2 min wax - 7% wood pulp Speed when spinning 1460. Drop test 14 in. cracks on second drop No 245 Blank used for test

4 Blanks No 249, 250, 251, 252
1/2 4 min wax 1/2 - 2 min wax 5% wood pulp
Speed when spinning 1460 1460 Drop test
14 in. cracked on first drop No 249
Blank used for test

4 Blanks No 253, 254, 255, 256
1/2 - 2 min wax 1/2 - 4 min wax 10% Cotton Flock
Speed when spinning 1460 - Drop test 14 in.
Chipped on second drop and cracked on
third drop No 253 Blank used for test

4 Blanks No - 257, 258, 259, 260
1/2 - 4 min wax 1/2 - 2 min wax 7% Cotton Flock
Speed when spinning 1460 - Drop test 14 in.
Cracked on second drop

4 Blanks No. 261, 262, 263, 264.
½ - 2 min wax ½ - 4 min wax 5% Cotton Flock
Speed when spinning 1460 - Drop test
14 inches slight crack on second drop
No-261 - Blank used for test

Mix for Blue Records

No-1 mix - 5 g tetra ½ g zinc sterate
200 mg Victoria Blue B. Base,
From Heller + Merz
To 15 g Shellac add 5.7 g of
No-1 mix

Blanks made in 24 building

#1 Dope put on temp 230 to 240 F warm blanks. blanks run 80 Rev stirrer at 217 R

#2 Dope put on temp 280 to 290 cold blanks blanks 80 R stirrer 217 R

#3 Dope put on 270 to 280 warm blank blank run 80 stirrer 217 R

#4 Dope put on at temp 280 to 290 cold blank
blank run 48R stirrer 217 R

#5 Dope put on temp 280 to 290 warm blank
blanks run 48 R, stirrer 217 R no dye put in

#6 Dope put on temp 270 to 280 cold blank
blank run 48R stirrer 217 no dye put in

#7 Dope put on temp 270 to 280 cold blanke blanks ran 80 R stirrer 217 no dye put in

#8 Dope put on temp 240 F cold blanke blanks ran 80 R stirrer 217 40 grams rec mix 1 gram of Phenacetin dope was very liquid

Exp. to have Shellac varnish stick to Blanks

#1000 - 4 min wax 90 g Rosin 10 g
6% Cotton Flock (N G)

#1001 4 min wax 80 g Rosin 20 g
6% Cotton Flock Mold Oven Temp. 270
temp of wax 270 (N G)

#1002 - 4 min wax 70 g Rosin 30 g
6% Cotton Flock Mold Oven temp 270
temp of wax 270 Can't extract at normal
temp & had to put on ice.
Won't extract good spots of wax
stick to mold (N G)

1003 Venice turpentine dissolved in Carbontetrachloride for Prime coat
(N G)

1004 Venice turps dissolved in Shellac Varnish
(N G)

1005 Venice turps dissolved in Carbon tetra then put in Petits oven all night temp of oven about 150, In morning turps all soaked in wood
(N G)

1006 Venice turps dissolved in Carbon tetra then mixed with Shellac varnish Then put in Petits oven
(N G)

1007 Took 2 of No 1005 put on another coat of Venice turps dissolved in Carbon tetra
(N G)

Better than Reg

1008 Raw Montan 90 Rosin 10 6% Flock
melting point to low about 160

#1009 Raw Montan 45 - 4 min wax 45 -
10 Rosin 6% Flock
not very good Pin holes in blanks

#1010 - 2 of no 1009 Coated with Venice turps dissolved in Car tet
for Prime Coat

#1011 - 4 min wax 95 Rosin 5 - Flock 6%
Venice turps disolved in Carbon tetrachloride
for Prime coat

#1012
90 Raw Montan 5 Rosin 25 White wax
6% Flock - would stand more flock

#1013
90 Raw Montan 5 Rosin 50 white wax
6% flock

" 1014 – 90 Raw Montan 50 white wax
6% flock . Don't mix good - Pin Holes

" 1015 – 90 4 min wax : Rosin 25 white wax
6% Flock

" 1016 - 90 4 min wax 5 Rosin 50 white
wax 6% Flock

" 1017 – 90 4 min wax 50 white wax 6% Flock
Don't mix good Pin holes

" 1018 - 90 Montan 25 Glsonite Flock 6%

" 1019 90 Montan 50 Gilsonite Flock 6%
sticks to mold (temp. when poured 840

1020 - 90 4 min wax 25 Gilsonite 6% flock
sticks to mold

#1021
90 – in wax 12½ Gilsonite 6% flock
sticks to mold

#1022 – 90 – 4 min wax 5 Gilsonite
6% flock – sticks

#1023 – 90 – 4 min wax 5 Gilsonite
5 stearic acid 6% Flock

#1024 – 90 – 4 min wax 10 Gilsonite
5 stearic acid 6% flock – sticks

#1025 – 120 – 4 in wax 75 Rosin
30 chalk 45 Gilsonite 6% flock
(sticks)

#1026 – 120 – 4 min wax 75 Rosin
60 chalk 45 Gilsonite 6% flock
sticks

#1027 – 120 – 4 in wax 75 Rosin
60 chalk 45 Gilsonite 40 stearic acid
6% flock

#1029 Given 5 coats 3 hrs between each coat left in drying Room 7 days befor pressing Sticks Good

#1028
Montan 180 Rosin 50 chalk 120
13 flock (chips out slightly on
Black

#1029
180 montan Rosin 50 chalk 75
12 flock + - not Practical in
Molding Blanks. Sticks to Mold in spots

#1030 - 180-4 min wax 50 Rosin
chalk 100 flock 14 - Stuck

#1031 - 184-4 min wax 50 Rosin
chalk 125 flock 14 (340°)
sticks

#1032 - 184-4 min wax 25 Rosin
chalk 100 flock 12 (sticks)

#1033 - 200 montan 25 Sod. Sterate
13 1/2 flock Sand mix good

5 coats 3 hrs between each coat
in drying Room 7 days

1035 No good for sticking _ 5 coats 3 hrs between
coats in drying Room 7 days

1036 No good for sticking 5 coats 3 hrs between
coats in drying Room 7 days

#1034
200 Montan 50 Soda sterate
13½ flock

#1035 _ 200 montan 75 Soda sterate
16.5 flock

#1036 _ Montan 200 Soda Sterate 100
flock 18 Poured at 280

#1037 _ 200-4 min wax 25 Sodium Sterate
13.5 flock — Pin holes

#1038 - 4 min wax 50 Sodium Sterate 6
Pin Holes

#1039 . 210 Rosin 4% flock 55 chalk
stuck

#1040 210 Rosin 55 chalk 25 Sodium
stearate 4% flock stuck on cap

#1041

210 Rosin 55 Chalk 75 Sodium Stearate
6% flock — Stuck NG

#1042 250 white wax 12% flock
Sodium Stearate 50 Pin Holes

#1043 Rosin 10 Caranaba wax 2 chalk 1
flock 1 — Sticks

#1044 Rosin 10 Gilsonite 5 ½ flock
Sticks

#1045 Rosin 10 Gilsonite 5 chalk 4
— Sticky

#1046 Rosin 10 Gilsonite 5 chalk 4
Montan 2 Sticky

#1047 Caranaba 5 Sodium Stearate 1
NG

#1048
Caranaba 5 Rosin 2 — Sticks

#1049 White wax 5 — Sod. Sterate 5 — flock 6%
Pin Holes

#1050 White wax 10 Sod sterate 5 —
flock 6% (Pin Holes)

1051 White wax 10 Sod sterate 5 —
Rosin 10 Flock 6% — sticks

1052 250 white wax 6% flock — Pin Holes

1053 250 white wax 50 Japan wax
6% flock Pin Holes)

1054 250 white wax 50 Japan wax
50 Black Ozokorite 6% flock
Pin Holes not good mix

1055 Black Ozokorite 5 white wax 1
6% flock (sticks)

#1056

High Speed Blanks prime coat of Air Drying Japan Put in Petits oven 14 hrs at about 150°

#1057 Black ozokerite 5 white wax 2 flock 5 (sticks)

#1058 High Speed Blanks prime coat of Bakerlight. In Petits oven 14 hrs

1059 High Speed Blanks prime coat of Sol. from Hockenjosh

1060 Enamel from Hockenjosh called Pecora Cuticle Enamel - U.S. Boot Dry

#1061
180 Raw Montan Rosin 40 Chalk 75 flock 12 (Chips on Extraction

#1062
180 Raw Montan Rosin 50 Infusorial-Earth 10 - Flock 13, 80 (Chips on Extraction

#1063

250 Raw Montan Rosin 50 Flock 16.8
Infusorial Earth 10 (Chips

#1064 - 300 Raw Montan Rosin 50
Flock 19.80 Infusorial Earth
Chips on Extraction

#1065
180 Raw Montan treated by Mr. Dodd
50 Rosin, Infusorial Earth 20
Flock 13.80 (Chips on Extraction

#1066
180 Raw Montan treated by Mr. Dodd
50 Rosin Infusorial Earth 20
13.80 Flock Lamp Black 5 (Sticks)

#1067

Dup of 1066 Except 10 of Lamp Black
chips

#1068
Raw Montan 180. Rosin 50
Flock 10 Chalk 75 Lamp Black 20
chips.

#1069

Dup. of 1068 Except 30 Lamp Black
(chips)

#1070
50 Rosin treated with zinc Oxide – 2½, then 180 Raw Montan F1673 Chalk 50 – (chips)

#1071 – Rosin 5 tetrachlornaphthaline ½
#1072 – " 5 " 1
#1073 – " 5 " 1½
#1074 – " 5 " 2
#1075 – " 5 " 3

#1076 Raw Montan 90 – 5 of No-1074
7% flock 25 Chalk Sticks to mold

#1077 4 min wax 90 – 5 of No. 1074
7% flock 25 chalk

1077 4 min wax 180 – 5 of No 1074 7% flock
50 chalk

#1078 X 700 Dodd Montane
200 Rosin
400 Chalk

#1078 XX
700 Raw Montan
200 Rosin
Melt & filter — add Chalk 400

#1078 XXX Raw Montan 600 — Dark Crude Rosin 250 300° F.
Melt together Raise temp 450° & filter — add Chalk 500

1080
NG Cracked — Drying Room

1082 X 700 Raw Montane
200 Rosin
200 Infusorial Earth
Temp. 300°

1078 — 175 Raw Montan 700
50 Rosin 200
100 Chalk — Sticks 400

#1079 175 — 4 min wax
50 Rosin Don't Stick
100 Chalk

#1080 175 Raw Montan
50 Rosin

Coated at 238 Opening 1/3 —

1081
175 - 4 min wax
50 - Rosin
Don't Stick
Coated at 240 Opening 1/2

1082
700 Raw Montan
200 Rosin
Limit 280 ~~337~~ Infusorial Earth
Coated at Opening Sticky

#1084X Raw Montan ✓ 700
Rosin 400
Infusorial Earth 280
Temp. 300

Nov 16th
#1084XX Raw Montane 700
Rosin (Dark Crude) 400
Melt - temp 430° + filter
Requires 3 hours to clear off
the froth.
Add Infusorial Earth 270
Dont raise temp above 310° F.

#1084XXX Nov. 17th
Raw Montan 700
Rosin (Dark Crude) 400
Heat to 450°. Evaporate all
Bubbles Reduce temp. to 400°
and filter - time consumed 2 hrs.
then add Infusorial Earth 260.

#1083
4 Min Record Wax 700
Rosin —— 200
Infusorial Earth 337
Coated at Opening
#1084 Raw Montan 700
Rosin —— 400
Infusorial Earth 412
Coated at Opening

#1085 - 4 min Record wax 800
Rosin —— 450 ✓
Infusorial 280
Coated at Opening ~~412~~

#1086 Raw Montan 700
Rosin —— 400
Coated at Opening
" 1087 - 4 min Record wax 700
Rosin —— 400
Coated at Opening

#1092X 4 mi wax 250
Rosin 100
Gilsonite 150
Shellac N.G. 100

1093X Same a #1093 except use
only 150 Earth

#1088 Water 200 cc Plaster Paris 150
5 flock

#1089 Water 200 cc Plaster Paris 200
flock 10

#1090 Water 200 cc Plaster Paris 200
flock 15

1091 - 4 mi wax 240 - Rosin 150
Gilsonite 100 Dont stick

1092 4 Mi. Wax 240 - Rosin 100
Gilsonite 150 Dont stick

1093 Raw Montan 600
Dark crude Rosin 250
melt, Raise temp to 500° and
lower temp to clear off Bubbles
filter at 400°
add Infusorial Earth (maximum Limit) 170.

#1094 Raw Montan 600
Dark Crude Rosin 250
Melt Raise temp to 500°
and add
White Rock clay 300
after well mixed - Filter

#1095 - Take #1092 after filtered
through linen Bag 750 parts
Melt & add Infusorial Earth 75 "
will take no more

1096 Raw Montan 700
Rosin 200
Gilsonite 100
Infusorial Earth 140

[ITEM FOUND IN BOOK]

Dally #16

Make 4 times Regular lot of shellac mix - + pour out plate about 5 inches diameter -

~~Change proportions~~ 17

so 15 Lac 4 Tetra 12 asbestos

another lot -

#18 - 15 Lac 5 Tetra. 12 asbestos and 15 Chalk

another lot,

#19 - 15 Lac 3 Tetra, 10 asbestos

#20

Dally Make one record without asbestos

shellac 135 Tetra 40

~~Make another without asbestos~~

[ITEM FOUND IN BOOK]

#21

Dally

Try Nova Resin in place of Shellac using same proportions of Tetra + asbestos but substitute the Resin for the shellac

Resin 150g Tetra 50g asbestos 60g Disk
Regular record 56.25g Resin 18.75g Tetra
22.5 Asbestos #31

~~3 [illegible] [illegible]~~ 15

~~[illegible] Resin [illegible] Tetra 18 asbestos~~

#22

Dally

Make the regular Lac mix but at 10% of flowers of Sulphur at the end just before you pour, + stir well but quickly

shellac 150 Tetra 50 Asbestos 60
flour of sulphur 26

[ITEM FOUND IN BOOK]

u

Dally—

Take some of the Coarse asbestos run it through the Rolls in Machine shop set very close together. Screw out the juices before trying it & only pass through the Coarse / pass stuff thru several times & let me see it under Microscope

Bintrotulol 12 asbestos

#23 15 Lac 4 Talva 1 Nitrotoluol 137

Binitrotulol

#24 15 Lac 3 Talva 2 Nitrotoluol 12 asbestos

#25

15 Lac 4 Talva – 1 Paraformaldehyde 12 asbestos

#26

15 Lac 3 Talva 2 Paraformaldehyde 12 asbestos

#27 Dianisidin Base

15 Lac 4 Talva 1 Dianisidin 12 asbestos

#28

15 Lac 3 Talva 2 " "

#29

15 Lac 4 Talva 1 Nitroanisol Para 12 asbestos

#30 " 2 " "

[ITEM FOUND IN BOOK]

Nov - 19 - 1910

Mr Ott.

Cold test on Records.

1-2- a-B

were put on ice test and did not show any cracks @ [illegible]

Then they were put in Carbon Acid test

1 were cracked after 30 min @ -40
" 2 " " " " " " "
" a " not " " " "
" B " " " " " " "

even after taken in warm room
a - B were OK

Christensen

Jan 6 - 1910

2

Cold test on Records for Mr Ott
Lot # 2.

Time	Temp °C	Temp °F	[illegible]	Remarks
400 Pm	[illegible] 8 "	17.6		
430 "	-4 "	25.		# 131-132-132
500 "	-17 "	+1.4		" 134-135-137
530 "	-34 "	-29		" 138-139-140
600 "	-40.	-40		" 145

Lot # 2 - 10 Records
were taken directly from Room temp at into 17.6 °F
and again from -40 into room temp at
a jump from 68° - 17° = 51° into cold
" " " -40 - 68 = 108° " warm
All were OK
wax also OK
Table of reading above

Chr.-

[ITEM FOUND IN BOOK]

Jan. 9-11 **#3**

Cold Test on Records
For Mr. Ott.

Lot # 3 - 12. Records

Time	Temp °C	Temp °F	Skids	Remarks.
9.10 a.m.	+3	37.4		
9.45 "	-6	21.2	1/3 open	At 11.15 [illegible] were
10.15 "	-15	+5	all open	filled again
10.45 "	-20	-4		with CO_2
11.15 "	-35	-31	sides all open	
11.35 "	-40	-40		Records are without
1145 "	"			cartoons
12.00 noon	-41	-41.8		
1230 P.m.	-42	-43.6		
1.00 "	-44	47.2		
1.30 "	-44	47.2		

Lot # 3 - 12 Records after gradually lowering the Temp. held at -40° to -47° for two hours. All OK at -47°F

a Jump of 240°F OK
From -47°F into boiling Water OK

Christensen

#4

Cold test on Records
for Mr. Ott
Lot # 4 - 4 records

Time	Tempt °C	Tempt °F	Skids	Remarks
1.50 P.M.	-40	-40	Sides all open.	
2.20 "	-36	-32.8	" closed.	Used CO_2
3.00 "	-27	-16.6	" "	which were used
3.30 "	-20	-4	skids all open.	for Lot # 3
4.00 "	-25	-13	sides "	"
4.20 "	-31	-24		# 131-134-135-1[illegible]

Lot # 4 - 4 records.
Put into -40°F from 68°F or Room Temp.
kept for 2 hours between -40 to -24
All OK

PS # 142 got a dent when taken out and cracked completely

Christensen

[ITEM FOUND IN BOOK]

Phonograph Records on Cold Test #9 Jan 25-11
F. M. Ott.
Lot # 6 - 12 Records
70-81-83-84-86-87-89-90-92-93-95-96

Time	Tept C	Tept F	Freezing Box	Remarks
11.00 a.m.	21 5.			CO_2 were put in
12.00 m	0	32	Sides open 1/3	Box between
1.00 p.m.	-20	-4	" " 1/2	11 - 12 a.m.
1.30	-26	-14.8	" " "	
2.00	-29	-20	" " all	
2.30	-30	-22	" " "	
3.00	-31	-23.8	sides 1/2 open	
3.30	-26	-32.8	" all "	More CO_2 added Blanks 170, 180, 181
4.00	-36	-32.8	" " "	183, 184, 186, 187, 189
5.00	-39	39.	" " "	190, 192, 193, 195, 196

Lot # 6 - 12 Records after a 6 hour cold test down to -39°
were all OK
Then were taken from -39° into 62°F
all OK. Christensen

[ITEM FOUND IN BOOK]

4 min wax	10% wood pulp	4 blanks	speed	1460	No 1, 2, 3, 4, 5, 6
"	7 " "	"	"		No 19, 20, 21, 22
"	5 " "	"	"		7, 8, 9, 10
"	10 " Cotton Flock	"	"		23, 24, 25, 26
"	7 " "	"	"		27, 28, 29, 30
"	5 " "	"	"		31, 32, 33, 34
2 min wax	10 " Wood Pulp	"	"		11, 12, 13, 14
"	5 " "	"	"		15, 16, 17, 18
"	7 " Cotton Flock	"	"		35, 36, 37, 38
"	5 " "	"	"		39, 40, 41, 42
1/2 - 4 min wax 1/2 - 2 min wax	10% wood pulp	4 Blanks	speed	1460	43, 44, 45, 46
"	7 " "	"	"		No 47, 48, 49, 50
"	5 " "	"	"		51, 52, 53, 54
"	10 " Cotton Flock	"	"		55, 56, 57, 58
"	5 " "	"	"		63, 64, 65, 66
"	7 " "	"	"		59, 60, 61, 62

Dup. the above at a lower Speed - 540

4 min wax	7% Cotton Flock	3 blanks	speed	540	No 67, 68, 69
"	5 "	"	"	"	" 70, 71, 72
2 "	7 "	"	"	"	" 73, 74, 75
2 "	5 "	"	"	"	" 76, 77, 78
1/2-4 min wax 1/2-2 min wax	7% Cotton	3 blanks	speed	540	" 79, 80, 81
"	5 "	"	"	"	82, 83, 84
4 min "	7% cotton flock	1 blank	"	"	197

No -	height of drop 14 in - times dropped	No -	height dropped 14 in - times dropped
No - 1	5	No - 78	4
" 19	3	73	25
" 10	2	76	6
" 23	16	79	27
" 28	5	82	19
" 31	4	197	2
" 11	4		
" 15	1		
" 35	43		
" 39	10		
" 43	6		
" 47	2		
" 51	1 Bad		
" 55	3		
" 59	2		
67			

Notebook, N-00-02-27

(X E-172) N-00-02-27

General Analyses
of Experiments

Work of Geo. Horn and
Mc Graw under supervision
of John Clarence Shengle

Book # 2.

Slag, Mr. Edison

SiO_2	43.48	
Al_2O_3	21.24	
Fe_2O_3	23.64	
CaS	.24	Total S .105
CaO	5.88	
MgO	.77	
MnO	Trace	
Alkalies, Moisture loss		

Magnesia asbestos

$25\% \, MgCO_3$

SiO_2	2.23
Al_2O_3	3.03
$CaSO_4$	1.80
$CaCO_3$	50.00
$MgCO_3$	42.17

Loss on Ignition.

~~49.65%~~ 51% of wt.

Magnesabestos

$85\% \, MgCO_3$

SiO_2	5.46
Al_2O_3	2.96
$CaSO_4$	1.40
$MgCO_3$	87.04

Loss ignition

49% of Wt.

Pages ore. Phil

Dolomite

SiO_2 1.31

$\left.\begin{array}{l}Al_2O_3\\Fe_2O_3\end{array}\right\}$ 2.97

$CaCO_3$ 54.

$MgCO_3$ 42.06

Williams Ore.

Fe_2O_3 = 50 %

Zn metalic = 16 %

Looks like
iron pyrites with zinc

Iron ore.
Concentrates Ballantine

Fe_2O_3 =

S = .033 %

P = .105 " ?

TiO_2 = .75

Examination of Edison & Gordon Battery Paste.

Qualitative.

For chlorine. Edison. NaCl 3½ % / Gordon NaCl 4½ "

Edison		Gordon
SiO_2	>	SiO_2
Al_2O_3	>	Al_2O_3
CaO (low)	<	CaO
—	—	Mn + Zn
SO_3		SO_3
P_2O_5	—	P_2O_5

Non-magnetic Zinc Tails Ristine

Zn = 40.00 %

Metallic Fe = 5.89

Zinc. Magnetic

Zn = 8.42

Met. Fe = 37.80

Wax Exp. 930

1. Naphthalene treated with conc. H_2SO_4 product a mixture of α and β naphthalene sulphonic acid - Sodium salt of β compound ~~insolu~~ soluble in water -

Sodium naphthalene sulphonate tried with different proportions of rosin Tallow and stearic acid does not form anything like a good wax -

2. Chlorine passed into naphthalene till mass

became buttery. a mixture of chlor derivatives. Mixed ~~with~~ mix proportion to form a naphthyl stearate with sodium stearate.

3. $KMnO_4$ with naphthalene forms phthalic acid.

4. $K_2Cr_2O_7$ oxidizes to phthalic acid.

Phthalic acid will & not combine to form an even substance with rosin or stearic acid

5 $MnO_2 + H_2SO_4$ forms with $C_{10}H_8$ a resinous acid not suitable even after re-crystallization.

6. Conc. HNO_3 formed at first mono nitro naphthalene low melting point –

Best results obtained with mono nitro naphthaline were

(1). 33 % $C_{10}H_7 . NO_2$
33 " stearic acid
33 " paraffin

(2). 25 % $C_{10}H_7NO_2$
25 % stearic acid
25 " paraffin
25 % rosin

(3). 50 % $C_{10}H_7NO_2$
50 % stearic acid

None of these gave a satisfactory wax but approached it in being more crystalline and ~~approxim~~ fairly even texture

7. Further treatment of mono nitro naphthalene with conc. HNO_3 gave di nitro naphthalene higher melting point.

Tried many combinations of this substance with stearic acid rosin and paraffin but none successful

8. A di nitro naphthalene nitrate reduced with hydrogen formed a com-

poured probably
amido nitro naphthaline
which gave no better
results -

Acetylene Exp.

2 grams of carbide gives about 700 c.c. of gas -

Solution of $CuSO_4$ did not take out all odor -

Alkaline solution made by dissolving ppted $Cu(OH)_2$ in 25% solution of boiling potash took very nearly all odor out

but seemed to form
too much black
residue for phosphide
Copper unless phosphor-
us present in large
quantities -
Ppt. collected from
tubes separated from
pumice stone and
examined showed
presence of small
amounts acetylide
of Copper.

With $CuSO_4$ in Tubes.

3.3 liters gas take .055 gms $CuSO_4$

or 1000 cu ft take 1 pound.

Exp. with.

Citrate of iron and ammonium in 1st tube

Fe acetate in 2nd

$FeCl_3$ in 3rd and

Pb acetate in 4th with

$CuSO_4$ in 5th and

alkaline copper in last. Only last

2 Tubes showed
a ppt. with 3 liters
of gas and gas at
outlet had same
perceptible odor as
from the 9 Tubes
of $CuSO_4$ –

Wax Exps.

Jan. 27 – 1900

700

Set napthaline and con. HNO_3 (1 of $C_{10}H_8$ to 4 of HNO_3 by weight) in dish. Allowed to stand [illegible]

701

About 200 cc of Potassium Chromate with about 25 cc of Con H_2SO_4 was placed on steam bath having been added about 20 grms. $C_{10}H_8$. Allowed to stand on steam bath a few hours. Filtered & allowed filtrate to stand.

No Good

#702
200 cc of $K_2Cr_2O_7$ in beaker with 25 cc of HCl and 20 grms $C_{10}H_8$ placed on steam bath over night. Diluted, filtered and allowed filtrate to stand

No Good.

#703
200 cc of $K_2Cr_2O_7$ in beaker with 25 cc $KMnO_4$ and 20 grms. $C_{10}H_8$ placed on steam bath.
After standing for 24 hrs. filtered.

No Good

704

200 cc of $K_2Cr_2O_7$ and 25 cc of H_2SO_4 with 40 gms. resin placed on steam bath for few hours. Poured off liquid + wash with H_2O. Placed on dish. On drying the color was lost to a noticeable extent, the sub. evidently having been oxidized

---

*705

200 cc of $K_2Cr_2O_7$ and 25 cc of HCl with 40 gms. resin placed in beaker on steam bath for a few hours, poured off liquid & washed with H_2O. Placed on dish. On drying the substance darkened considerably in color.

#706

About 200 cc $K_2Cr_2O_7$ with about 25 cc $KMnO_4$ add 40 gms resin. Placed on steam bath. for few hours. Poured off liquid + washed with H_2O, placed on desk. On drying the color was noticeably change. On cross section examination the sub. appeared quite homogeneous.

707

Took about 200 cc $KMnO_4$ with about 25 cc (H_2SO_4) and 20 gms $C_{10}H_8$ placed on steam bath.

No apparent reaction.

#708

Took about 200 cc $KMnO_4$ and 25 cc HCl with 20 gms. $C_{10}H_8$ and placed on steam bath for few hrs.

Poured off liquid & covered residue with [illegible] steam bath. Found it insoluable. Filtered off allowed to stand. No apparent reaction

#709

[illegible] 200 cc $KMnO_4$ and 25 cc H_2SO_4 with 40 gms. resin & placed on steam bath. Solution soon changed from reddish color to cloudy yellow.

[illegible] residue [illegible] dry [illegible]

The mass changed color on drying and in cross section was found to be quite homeogeneous

#790.
Took 200 cc $KMnO_4$ and 25 cc
HCl with 40 gms. resin + placed
on steam bath
Poured off liquid and placed
residue on dry plate.
Changed color on drying and
in cross section was found
quite homogeneous.

March. 2, '00

711

Ran Chlorine for 20 minutes through $C_{10}H_8$ (50 gms).
Filtered it through cloth & allowed to stand. $C_{10}H_8$ crystalized over almost immediatly.

712

Chlorinated $C_{10}H_8$ for $2\frac{3}{4}$ hrs. the chlorine coming over in good quantity only about $\frac{1}{2}$ the time.
The substance was of much darker color than that of # 711.

7/3

Chlorinated $C_{10}H_8$ for 7 hours. At one time a small quantity from the wash-water ran over into flask, causing a cloudy appearance & on passing more chlorine through an oily substance appeared upon surface. Also some of the caustic soda solution ran back into flask. The Chl. $C_{10}H_8$ was set aside in dish. A substance crystalizing out. The current was not constant a greater part of the time

7/3a Chlorinated 100 grms. $C_{10}H_8$ for 9 hrs. Current quite steady but not very strong. Same appearances as 7/3

714
Clorinated rosin covered with H_2O in flask for 1 hrs. The soda ran back so the exp. was repeated as stated in 715

715
Clorinated rosin as above for $2\frac{1}{4}$ hrs. The substance turned dark in color it being in a liquid state. Upon cooling the mass became very brittle..

716 Clorinated melted rosin directly in pan for two & three fourths hrs. The sub. turned dark very quickly and became brittle on cooling. Very homogeneous and having a smooth polished surface all the odor characteristic of rosin having disappeared. Still sticky to touch. not as brittle as plain rosin

717

Took 30 gms. resin W.W. and 30 gms paraffine (120) and melted together in ~~poly~~ then chlorinated for $3\frac{1}{4}$ hrs. Sub. became very dark in color almost if not quite a black. Soft and sticky

718 Chlorinated 20 gms. $C_{10}H_8$ and 20 gms. resin for $\frac{1}{2}$ hrs. Substance turned dark in color. (brown). Did not present a surface as homogeneous as 716 and 717.

719
Took 30 grms. of $C_{10}H_8$ and 20 grms. paraffine, melted together and chlorinated for 2 hours. Substance was very inflammable, not homogeneous. A.G.

720 Took 60 grms. wood tar pitch and 15 grms. paraffine melted & chlorinated for 2 hours.
rather hard, brittle, dry.

#721

Took 100 gms. parafine (120) melted + added first 10 gms of wood tar pitch then adding 10 gms. at time until 60 gms. had been added. The more ~~pitch~~ added the longer the substance took to harden when cooling. Added to compound of 100 gms. of parafine + 60 gms. wood tar pitch 5 gms of carnauba wax. Took longer time to harden. [illegible]

722

Took 100 gms. parafine (120) + added [illegible] melting first 10 gms [illegible] 20 and adding 10 gms at a time until 110 gms had been added [illegible] rosin added the longer it took to harden on cooling. Added to the compound of 100 gms [illegible] fine + 110 g rosin, 16 [illegible] [illegible] The substance [illegible] cooling was light yellow + sheared as if something could be done to it. It was a little gummy.

#723 100 gms paraffine (120°)
110 gms. woodlati pitch
8 gms. carnauba wax

Too slow to set, then added
15 gms. magnesium resinate
Not brittle enough. So added
15 gms. more of Mg. resinate
and moulded small cylinder
which has a reddish brown color.

#724 100 gms. paraffine (120°)
110 gms. resin (w w)
16 gms. manila gum
Shaved nicely but is too gummy

Sticky

By weight

#725

$5\frac{1}{2}$ of wood tar pitch $16\frac{1}{2}$ grms.
5 of paraffine 15 grms.
$\frac{1}{2}$ of carnauba wax $1\frac{1}{2}$ grms.
5 of Ca. resinate (WW 200 : 13) 15 grms.

Small cylinder was formed. Lighter in color than 723 but cooled far more rapidly. The Ca. resinate seemingly having better effect than Mg. resinate. (Cylinder both during cooling and after not worth a d — Impossible to mould decently)

726 Clorinated for one hour
55 gms. resin
50 gms. paraffine

Turned very dark in color. On cooling it did not form a substance that would shave well.

727 Clorinated for one hour
55 gms. wood tar pitch
50 gms. paraffine

728 Took ½ of 727 remelted + reclorinated ½ hour. The mixture carbonized + was therefore useless as a wax.

(See 723) Mar. 10/08

729 Clorinated for $1\frac{1}{4}$ hours
100 gms. paraffin
110 gms. insulation pitch
8 gms carnauba wax
30 gms. eng. resinate

730 Clorinated for $1\frac{1}{4}$ hours (See 724)
100 gms. paraffine (120°)
110 gms. rosin (W.W.)
16 gms Manila gum.

731 (see 720)

8 gms. wood tar pitch.
2 Gms paraffine (120)

Melted together & cooled.
The mixture solidified without contraction.

Sticky

---

732 Mar. 12, 00.

Took 40 gms. $C_{10}H_8$ & passed Sulphur dioxide through for one and three fourths hours.
The color changed very slightly when the $C_{10}H_8$ melted.
Current was good for about 30 minutes only.
On cooling the $C_{10}H_8$ crystalized out.

No change.

733
Passed SO_2 through $C_{10}H_8$ for one hour
The $C_{10}H_8$ crystallized out on
cooling as in 732

#734 Passed SO_2 through rosin for
three hours.
The rosin turned precipitately
darker in color, but on cooling
the chemical composition of the
rosin seemed unchanged.

#735 Passed SO_2 through 27½ gms.
wood tar pitch melted with 25
gms. of paraffine (125) proportions
same as 721, for four hours. When cold
sub. chars nicely but is too sticky.
Color almost black.

Mar. 13/00

736 Passed NO through 30 gms. of $C_{10}H_8$ for $\frac{3}{4}$ hours. On cooling the $C_{10}H_8$ crystalized out as in #732

#737 Passed NO through rosin (WW) 50 gms. for $5\frac{1}{2}$ hours. Rosin was considerably darker in color but remained jelly & is brittle when cold.

#738
Passed NO through $27\frac{1}{2}$ gms of wood tar pitch melted with 25 gms. paraffine (125°) for 3 hrs. When cool the mass is similar to #735.

#739 Took 30 gms $C_{10}H_8$ & passed H_2S through for fifteen minutes. $C_{10}H_8$ crystalized out. The sub. had a brown color.

740. Took 50 gms. rosin + passed H_2S Jan. 14
through for 45 minutes
There was no visible change.

740 Passed H_2S for 45 minutes
through 50 gms. wood tar pitch
melted with 20 gms. paraffine (125)
No apparent change.

741 Passed H_2S through 20 gms.
of wood tar pitch melted with
20 gms. paraffine (125°) for one
hour. Too sticky

742 Took 50 gms. rosin, ground in
mortar. Placed in conc. HNO_3
and allowed to stand. Next day
yellow fluffy sub. Decided action.
Rosin still retains stickiness

Mar. 14

#743 Ground 50 gms wood tar pitch and covered with con. nitric acid + allowed to stand. Slight action.

#744 Passed H_2S through 50 gms wood tar pitch for one hour. When cool it was very homogeneous having a highly polished surface. Very brittle. Not as sticky as before.

#745 Passed ammonia through 35 gms. $C_{10}H_8$ for 30 minutes. The $C_{10}H_8$ crystalized out on cooling – no apparent reaction having taken place

Mar. 14

#746. Passed NH_3 through rosin for 30 minutes. Darker in color otherwise no change.

Mar. 15 1911

#747 Passed NH_3 through wood tar pitch for one hour. No apparent change.

#748 Passed NH_3 through $27\frac{1}{2}$ gms wood tar pitch melted with 20 gms. parafin (125°) for $\frac{1}{2}$ hour. Half hour after it was very gummy

#749 Took 20 gms. of #720 which is 20 gms. wood tar pitch to 15 gm. paraffin (130°) chlorinated for 2 hours. To this added 2 gms sodium oleate (66.5°) melted together. Very sticky but not waxy enough. Looks as if parafine had carbonized.

Mar 15 '00

750 Melted 16 gms. wood tar pitch with 4 gms. paraffine (125°) & allowed to cool. It was sticky. Looks as if paraffine had carbonized.

#751
80% or 32 gms. of #720
10% " 4 gms Sodium Stearate (6.65
10% " 4 " Resinate Manganese
Melted together.
Too gummy.

752

3/20/00 50% #704
" 50% Soda Fl[illegible] 6.65

Doe[illegible] not mix [illegible] during mixing very foamy.

Gummy

753

3/20/00 5 g 704
5 g pair,
5 g St. Soda 6.65

N. J. Fohl

754 — Mixture 704 — the mass is very brittle
7/20/08 more so than common rosin and sticky.
The decrease in bulk is considerable

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755 Mixture 705
3/28/00 N. G.
Won't melt.

756
4/25/00 50 g. Carnauba
50 g. wood tar pitch

Pretty Good
but sticky.

---

757 Saponified
4/25/00 Castor oil with
stick Caustic Soda
N. G.

---

758 Saponified
4/25/00 ~~Cotton~~ Cottonsea oil with
stick caustic soda
N. G.

759 400 g. Rosin wg
4/25/00 20 g. CaO.

760
4/25/00 100 g. Rosin wg
5 g MnO_2

---

761 50 Car.
4/25/00 50. W. D. P.
10 par

pretty good
stick

762 2 prs car.
4/25/00 1 pr. par
Forde

21 prs #760
763 10 " car
4/25/00 5 " par:
Jai Bur
Shak

764

4/26/00 200 g. Rosin
1 g. MnO_2

765

5/2/00 Rosin melted
treated with
Conc. HNO_3.

766
1/2/00 Rosin treated
with conc HCl
a little sticky

767
1/2/00 Rosin treated
with conc H_2SO_4

768

5/7/00 Rosin treated
With Aluminum Chloride
Apparently no reaction

769

5/8/00 100 grs rosin
1 c.c. conc H_2SO_4

Sticky

770
5/3/00 100 g. rosin with
2 c.c. conc H_2SO_4
Sticky

771
5/3/00 100 g. rosin with
3 c.c. Conc. H_2SO_4
Sticky

772
5/3/00 100 g. rosin W.W.
4 ~~g.~~ c.c. Conc. H_2SO_4
not as sticky as the others

773
5/3/00 100 g. rosin W.W.
6 ~~g.~~ c.c. Conc. H_2SO_4
See #777

774

√ 7/3/00 · 100 g. Rosin Co.W.

8 g.c. conc H_2SO_4

see # 777

775

√ 7/3/00 100 pts rosin wg

10 ~~pt~~ g.c. conc H_2SO_4

see # 777

776

5/3/00 100 g rosin cow
12 c.c. conc H_2SO_4

see # 777

777

5/3/00 100 g. rosin cow
14 c.c. conc H_2SO_4

Best of the lot.
less brittle than common rosin &
less sticky

778
5/4/00 100 g. [illegible]
2 c.c. Conc HNO_3

779
5/4/00 100 g. rosin [illegible].
4 c.c. Conc. HNO_3

780

5/4/00 100 g. rosin urea
6 c.c. conc. HNO_3

781

5/4/00 100 g. rosin urea
8 c.c conc. HNO_3

782
5/4/00 100 g. rosin w.w.
+ 10 c.c. conc HNO_3.

783
5/9/00 stearate of lead
proportion 400 to
300 lead acetate
350 " "
400 " "
450 " "
500 " "
525 " "
550 " "

784 –

5/10/00 Solubility of Resinate Iron in paraffine

N.G. very slightly scarcely a trace

785

5/10/00 Made rosin soap and pptd the resinic acids with HCl.

The melted acids have the appearance of rosin.

Probably due to free resinic acid

786
5/11/00 Resinate iron
Acetic Ether
Very slightly

787 Methyl spirits
5/11/00 Resinate iron
slightly

788
5/11/00 Resinate Iron
Ethyl spirits
Slightly, scarcely a trace

789
5/11/00 Resinate Iron
Kerosene slightly

790
5/11/00 Resinate iron
Gasoline slightly

791 Benzine
5/11/00 Resinate iron

792 Benzoe
5/11/00 Resinate iron
completely & readily

793 Chloroform
5/11/00 Resinate iron
readily even in cold

794 Carbon Bisulphide
5/11/00 Resinate iron
in the cold

795 Ether
5/11/00 Resinate iron
~~in~~ the cold

796 Stearic acid
5/11/00 Resinate Iron
soluble
(whether a solution takes place or Transposition or both probably a transposition)

---

797 Oleic acid
5/11/00 Resinate Iron
soluble -
see ( ) F796

798

5/11/00 Naphthalin

Resinate Ba

readily soluble

Upon cooling the mass is hard & crystalline & cannot be softened up with paraffine as this throws out the resinate Ba

799

5/11/00 Stearate Soda
(Stearic Acid 700)
(Sal Soda 154)

Resinate Copper

Hard to say
just what does take
place — the Stearate
is colored green & has
a settlement at bottom

6/5/00 Dosed up

#777 with various

proportion Sulphur.

The Sulphur goes in

very nicely with little

or no froth

Upon cooking a while

Chemical action Commences

accompanied by froth

The resulting mixture is entirely

different from Rosin - it is light yellow

running to red. Cuts nice but soft

and not brittle in large pieces but

apt to crumble upon cutting

a little Cuban asphalt improve

Too Soft

6/7/60 Cementing wax for [illegible]

85% W.D.P.

15% paraffin

50 pts W.D.P.

50 " "

50 " "

50 "

50 "

6/11/00

Mr Edison suggested finding a partial solvent for the resinates, then separating the insol. part, decompose with acids and then make sodium salt. This idea is to get rid of sticky portion. The resinates are completely sol. in Benzol, carbon bisulphide, Ether and Chloroform, Naphthaline, partially soluble in Kerosene, Gasoline, Methyl & Ethyl alcohol, Benzine,

Apparently unaffected by paraffine, Glycerine

6/11/00 Treated the resinates of Ca, Ba, Pb, Al, Cu, and Iron and zinc with Kerosene, then decanted off the Kerosene solution and treated insoluble part with dilute HCl. - The HCl and also dilute H_2SO_4 has little or no decomposing effect on the resinates.

6/17/00 Made rosin soap with the idea of making a few resinate. — something else occurs to me to try — electrolyze the sodium resinate in alc. sol which I did — the results to morrow

Also make partial saponification of the rosin

also continued the sol. of the resinates in Kerosene and turpentine — they do not appear to be decomposed by acids

9/17/00

Cement for Joven O.H.

5 pts rosin — Easy
2½ " plaster of Paris hard

equal parts
rosin & plaster of Paris
very hard

1 pt rosin
2 " plaster of paris

Too much plaster of paris

10 pts rosin
5 " plaster paris
1 " Japan wax
Too soft - i.e. hard but pliable

6/13/00

ppt. resinate of manganese from sodium resinate solution by means of a manganese salt

---

passed current through a solution of sodium resinate - a deposite appeared on the positive pole - white which upon fusion had the same appearance and sticky qualities of rosin - upon leaving the deposit in the solution over night, it all dissolved - It is probably nothing more than the resinic acids. The solution has a

better conductivity than
the alkaline solution of the
same salt.

6/14/00 Continued the partial
Saponification of rosin.

Passed hydrochloric acid gas
through rosin - then added
zinc metal and then pass
gas through again for 3 hours
longer - sticky - then added
sal soda - still sticky, apparently
no change

Treated melted rosin with
sulphur chloride - apparently
the same compound resulted
as when treated with flour
sulphur but without the
disagreeable smelling gas.

This however appeared a little stickier than the other -
Then treated it with some metallic zinc, apparently no reaction -
Then added sal soda which entered into combination immediately - resulting compound sticky.

Remelted the resinic acids ppt by the current but found them unchanged

---

Continued washing the manganese resinate

6/15/00

The portion of the residue of Pb insoluble in Kerosene is only one decomposed by acids even upon boiling - the ppt. resinic acid is sticky and rosin like in appearance

Made alcohol solutions of rosin and compound got yesterday and reduced with zinc & hydrochloric acid. With the latter solution, no reaction ~~Pb~~ between Zn & HCl occured, but in former reduction took place

made Carbon bisulphide solution of rosin and then tried to reduce with nascent hydrogen, could not generate the H on account of great S. G. of CS_2

Evaporated off alcohol the resulting mass gelatinous looking, sticky, but hard before fusion - after fusion the stuff sticky & similar to rosin.

6/16/00

Treated rosin with hydriodic acid & red phosphorus in different proportions, then added the soda in different amounts. The resulting compounds vary ~~slightly~~ varied in color. They still possessed the stickiness common to rosin.

6/18/00

Continued the hydrochloric acid treatment, also the hydro-iodic acid + phosphorus.

Have commenced a series of experiments - treating rosin with various substances under pressure - did considerable reading - First tried sulphur + rosin - ordinarily decomposition at the point of chemical combination & 18% by wt is lost in gases

6/19/00

Made two experiments under pressure with rosin, sulphur, and Cuban Asphalt but lost both by explosion.

Mr Mallory gave me a zinc ore to analyze - sampled it thoroughly and began three for zinc determination and one for a qualitative examin.

6/20/00

Continued Zinc re analysis found it necessary to ppt Zn as Zn S first & then as basic carb.

Heated rosin & S under pressure also rosin & $ZnCl_2$ again. both under pressure & in pan - See [P] 1038 etc

6/21/00

Three more explosions.

Treated resin with $ZnCl_2$ with the purpose of dosing & further working up the product

Finish the zinc determinations but just as about to weigh the steam fitter spoiled them; so must repeat.

Have decided to stop heating materials in glass tubes.
Too expensive
" dangerous
& the experiments that have been finished give little or no encouragement for continuing along this line

6/27/00

Started and practically finished the zinc determination

Dosed up the rosin treated — with zinc chloride with sodium stearate, sodium resinate — with the idea of a possible joining of the stearic acid radical with that of the rosin and the two rosin radicles together.

See tomorrow

Passed HCl gas through the rosin treated with zinc chloride no change except increased stickiness

6/23/00 Saturday.
Weighed the grie or oil &
reported them to Mr Mallory.
Tried to get a reaction to
occur between chlorinated
naphthalene and the sodium salt
of stearic acid & rosin. That is endeavored
to form an ester of the
naphthalene & stearic acid & rosin.
Kept it at temp of 140°C for
fours hours in sealed tube
but apparently no reaction, will
continue monday.

Passed HCl gas through oleic
acid so as to formed an addition
product, then will treate

this compound same way
as the chlorinated naphthalene
It is darker & more liquid
than plain oleic acid. Will
also further chlorinate it but it
will not be practical commercially
Will also try this ester
reaction in alcoholic solution.

6/25/00 Continued the experiments started Saturday – for results see Book 4.

Also started a qualitative analysis of an ore sent in.

6/26/00.

Nelson the new Chemist Started in, Had him making Muriate Mg & Stearate of Mg. Continued on the ore and began quantitative analysis.

Also did work on the battery for Edison Mfg. Co. See BK. on Ed. Mfg. Co.

Notebook, N-00-03-12

Phonograph Cylinder
Book # 3

John Clarence Shengle

Cf # 659 - 660 - 661 - 662 & 666

#661 is best and #662 next but not as good as regular.

Both are gummy on the reamer, edges etc.

---

666 = 95% # 651
3/12/00 5% Black Ceresin

---

667 - 90% # 651
3/12/00 10% Blk Ceresin

---

668 85% # 651
3/12/00 15% Blk Ceresin

---

669 95% # 651
3/12/00 5% Japan wax

---

670 90% # 651
3/12/00 10% Japan wax

---

671 - 40 g. Stearate Soda (7.80)
3/12/00 10 g. Stearic acid
30 g. rosin wg
20 g. Blk ceresin
5 g. Mg CO_3

Brittle, Hard, N.G.

672 — 40 g. Stearate Soda 7.80
10 g. Stearic Acid
3/12/00 — 30 g. Wood tar pitch
20 g. Blk Ceresine
5 g. Mg CO_3

Brittle, Hard, N.G.

---

673 — 40 g. Stearate Soda 7.80
10 g. Stearic acid
3/12/00 — 30 g. Burgundy ~~wood tar~~ pitch
20 g. Blk ceresine
5 g. Mg CO_3

Brittle, not so hard & dry as 672 N.G.

---

674 — 40 g. Stearate Soda 7.80
10 g. Stearic Acid
3/12/00 — 30 g. rosin wg
20 g. Paraffine 120
5 g. $MgCO_3$

Brittle, ~~make large cylinder~~ N.G.

675 — 40 g. Stearate Soda 7.80
3/12/00 10 g. Stearic acid
30 g. Woodtar pitch
20 g. Paraffine 120
5 g. $MgCO_3$
Brittle

676 40 g. Stearate Soda 7.80
3/12/00 10 g. Stearic acid
30 g. Burgundy pitch
20 g. Paraffine 120
5 g. $MgCO_3$
Fair - marks carry

677 — 30 g. Stearate Soda 7.80
3/12/00 10 g. Stearic acid
35 g. rosin wg.
25 g. Paraffine 120
5 g. $MgCO_3$
Fair — does not as good as 676

678- 30 g. Stearate Soda 7.80
3/12/00 10 g. Stearic acid
35 g. Wood tar pitch
25 g. Paraffine 120
5 g. $MgCO_3$
Brittle

679- 30 g. Stearate Soda 7.80
3/12/00 10 g. Stearic acid
35 g. Burgundy pitch
25 g. Paraffine 120
5 g. $MgCO_3$
Fair - mass change

680- 30 g. Stearate Soda (6.65)
3/12/00 10 g. Stearic acid
35 g. Resin wax
25 g. Best ceresine
5 g. $MgCO_3$
Hard, brittle, N.G.

681 30g. Stearate Soda 6.6 5
3/12/00 10g. Stearic Acid
35g. Mixed tarpitch
25g. Bek Ceresine
5g. $MgCO_3$
Hard, brittle - n.g.

682 - 30g. Stearate Soda 6.65 -
10g. Stearic acid
3/12/00 35g. Burgundy pitch
25g. Bek Ceresine
5g. $MgCO_3$

Brittle - n. g. Infg.
magic flame.

683 - 25g. Stearate Soda 6.65 -
5g. Stearic acid.
3/13/00 40g. rosin wg.
~~Del~~ 30g. ~~Bee~~ Paraffine 120
5g. $MgCO_3$
more cargo
Fair

684

3/13/00

25 g. Stearate Soda 6.65

5 g Stearic Acid

40 g. wood tar pitch

30 g. paraffine 120

5 g. Mg CO_3

Fair - shavings not so dry

685

3/13/00

25 g. Stearate Soda 6.65

5 g. Stearic acid

40 g. Burgundy pitch

30 g. paraffine 120

5 g. Mg CO_3 -

Fair - better than 684

686

3/13/00

25 g. Stearate Soda 6.65

5 g. Stearic acid

40 g. rosin wg

30 g. Blk ceresine

5 g. Mg CO_3

Hard, brittle

687 25 g. Stearate Soda 6.6 1-
1 g. Stearic acid
3/13/00 40 g. wood tar pitch
30 g. BEK ceresine
5 g. $MgCO_3$
Hard - brittle - n. g.

---

688 25 g. Stearate Soda 6.6 1-
1 g. Stearic acid
3/13/00 40 g. Burgundy pitch
30 g. BEK ceresine
5 g. $MgCO_3$
Brittle - gummy hardness

---

689 30 g. Mg resinate 100 : 1-
3/13/00 20 g. paraffine 120
n. g. - doesn't mix - brittle when cool - fair. soft

690 30 g. Mg resinate 100 : 1-
3/13/00 20 g. BEK ceresine
n. g. no mix good.

691 10 g. Stearate Ca 100:8
3/13/00 15 g. Mg. Stearate 100:10
40 g. Rosin wg.
30 g. paraffine 120
5 g. Mg CO3
very hard to fuse soft - gummy

692 10 g. Stearate Ca 100:8
15 g. Mg Stearate 100:10
3/13/00 40 g. wood tarpitch
30 g. paraffine 120
5 g. Mg CO3
fuses with difficulty very soft.

693 10 g. Stearate Ca 100:8
15 g. " Mg 100:10
3/13/00 40 g. Burgundy pitch
30 g. paraffine 120
5 g. Mg CO3
soft, sticky

694 10 g. Ca Stearate 100:8
15 g. Mg Stearate 100:10
3/13/00 40 g Rosin wg
30 g Bek ceresine
5 g. MgCO_3 gummy.
N. G. The Mg fails to cure.

695 20 g Mg Stearate
10 g. Ca "
3/13/00 40 g. rosin wg
30 g. paraffin
5 g. Mg CO_3
gummy, soft - very

696 20 g. Mg Stearate
10 g. Ca "
3/14/00 40 g. rosin wg
30 g. Bek ceresine
5 g. Mg CO_3
Brittle - gummy.

2.60
50
3.00
60
6.70

.55
...
2.20
...
14.00
25.20
50
2.40
6.50

697 20g Mg Stearate 100:10
50g. rosin
3/14/00 30g. paraffine 120
5g. Mg CO_3
O.K.

---

698 30g. Ca Stearate 100:8
50g. rosin wg
3/14/00 20g paraffine 120
5g. Mg CO_3
Just fair

---

699 25g. Ca Stearate 100:8
5g. Stearate zinc 100:55
50g. rosin wg
3/14/00 20g. paraffine 120
5g. Mg CO_3
Not dry

For 700 — 799 see Book #2

#800 3/14/00
25 g. Stearate Soda 6.6 s
40 g. rosin WG.
30 g. paraffine 120
7 g. $MgCO_3$

Not running

#801 — 3/14/00
30 g. rosin, [illegible]
20 g paraffine 125
2 g. $MgCO_3$

---

802 3/15/00
200 c.c. Soda sol.
18° B —
2 g. al.
400 g. Stearic Acid

---

803 3/16/00
200 cc Soda sol.
18° B.
3 g al.
400 g. Stearic Acid

804 200 g.c. Soda sol.
3/16/00 18° B.
4 g. al.
400 g. Stearic acid

805 140 c.c. Soda sol.
3/16/00 18° B.
4 g. al.
soft. 300 g. Stearic acid
gummy. 200 g. resin wg.
s.g.

806 – Marler cyl.
3/20/00 ~~1440 g.~~ Rignocer.
~~110 g. Sal Soda~~
~~1510 g. Acetate Soda~~
200 g. Sal Soda

Stearate Soda used in
807-808-809-811-812-813
814-816

700 grs. Stearic Acid
134 g. Sal Soda

807
3/20/00 50 g. Stearate Soda
300 g. B. pitch
20 g. paraffine 125
5 g. Mg CO_3
no perceptible contraction
fair to ream etc

808 40 g. Stearate Soda
3/20/00 35 g. rosin wg
25 g. paraffine 125
5 g. Mg CO_3
no perceptible ~~contraction~~
fair to ream etc

809 3/21/00
40 g. Stearat Soda
30 g. B. pitch
25 g. paraffine
5 g. $MgCO_3$
N.G. very soft - takes
a fleas 2 hrs to harden

Master Cyl.

810. 3/20/00
600 g. Stearic Acid
24 0 g. Acetate Soda
40 g. Stearate Al.
120 g. Carnauba

811   40 g Stearate Soda
3/21/00   35 g Burgundy pitch
25 g Beis cerasine
5 g $MgCO_3$

Very hard to mould
takes a long time to harden.
very gumming on seaming +
edging and shaving

812.   30 g Stearate Soda
40 g resin wg.
3/21/00   30 g paraffine 125
5 g $MgCO_3$

N. G.
Too long to harden

14 8/3 — 30g. Stearate Soda
3/21/50 — 40g. wood tar pitch
3/22/50 — 30g. paraffine 125—
5g. $MgCO_3$

Can't mould

14 8/4 — 30g. Stearate Soda
3/21/50. — 30g. paraffine 125
3/22/50 — 40g. Burg. Pitch
5g $MgCO_3$

14 8/5 — 30g Stearate Ca 100.8
3/22/50 — 15g. rosin wg.
20g. paraffine 125—
5g $MgCO_3$

480
40
200
36
7.56

#816 40g. Stearate Soda
3/22/00 35g. Resinate Ca 200:5
25g paraffine 125
3g. Mg CO_3
Alright on edger etc

#817 ~~40~~ 30g. Stearate Soda
3/22/00 30g. Resinate Ca 200:9
30g. paraffine 125
3g $MgCO_3$
pretty good on edger etc

#818 50% #801
3/23/00 50% #802
nice contraction
It cools first and then takes
a long time to solidify ~~harden~~ before
being hard enough to take out of mould

819 60% #801
3/23/00 40% #803
See #818 - much harder to filter
middlin - Gummy.

---

820 70% #801
3/23/00 30% #802
See #819 ditto

---

821 75% #801
3/23/00 25% Stearate al.
rather hard to mix. Will
not melt to a homo. fluid

---

822 50% #801
3/23/00 50% Regnocer
very gummy on edges etc

823 50% #801
3/23/00 15% Bur. Pitch
Mod. gr. 10% paraffine 125
25% St. Zinc

8.24 68% #802
3/23/00 24% rosin wax
M/1. streaky 8% par. 125
coarse grained

---

825 68% #802
3/23/00 M.F. 24% B. pitch
, coarse 8% par. 125

---

826 68% #802
3/23/00 Rough 24% Wood tar pitch
8% par. 125

827 60% " 80z
30% Rounding
3/28/00 Dickey 10% pas. 125

828 60% " 80z
3/28/00 30% Dispatch
Dickey 10% pas. 125
Corne

829 60% " 80z
3/28/00 20% Roun ung
20% pas 125

830 60% " 80z
3/28/00 20% 13. pitch
20% pas 125
Rather mild contraction

831 600% " 802
3/23/00 ~~700/80~~ Wood & Purcl
200% par 125

---

832 ~~150%~~ " 802
3/23/00 300% Rosendwig
200% par 125

---

833 ~~1500%~~ " 802
3/23/00 ~~300%~~ Rex purcl
200% par 125

---

834 ~~150%~~ " 802
3/23/00 300% W. J. P.
200% par 125

835 36% #802
3/23/00 48% Rosin wg
16% par 125

836 36% #802
3/23/00 48% B. pitch
16% par 125

837 36% #802
3/23/00 48% W.G.P.
16% par 125

838 60% #803
3/23/00 32.5% Rosin wg
7.5% par 125

839 60% #803
3/23/00 25% B. Pitch
15% Tar 125

---

840 50% "803
3/23/00 30% Rosin wax
20% Tar 125

---

841 50% "803
3/23/00 30% B. pitch
20% Tar 125

---

842 50% "803
3/23/00 30% Rosin W. P.
20% Tar 125

843 40% #803
3/23/00 35% Rosin wax
25% par 125

844 40% #803.
3/23/00 35% B. Pitch
25% par 125

845 40% #803
3/23/00 30% Rosin wax
30% par 125

846 40% #803
3/23/00 30% B. Pitch
30% par 125

847 3/23/00
40% #803
30% W.I.P.
30% par 125-

848 3/23/00
30% #803
40% Rounding
30% par 125-

849 3/23/00
[illegible]% #803
[illegible]% B. punch
30% par 125-

850 3/23/00
[illegible]% #803
[illegible]% Rounding
25% par 125-

851 3/23/00
30% #803
45% B. punch
25% par 125-

807 - 808 - 816 - 818 - 822

849 - 854 - 855

819 and "855" kept but not as

loud as regular

852 — 60% # 80[illegible]
3/28/00 — 30% Rosiding
10% par. 130
very gummy in reamer, edger & trimmer

853 — ~~10~~ 60% # 80[illegible]
3/28/00 — 30% Rosin pitch
10% par. 125

854 — 60% # 80[illegible]
3/28/00 — 20% Rosining
20% par. 125
very gummy.

855 — Mica 60% # 80[illegible]
3/28/00 — Carbon black 20% dr. [illegible]
very 20% par. 125
gummy in reaming

856 — 50% # 80[illegible]
3/28/00 — 35% Rosin
10% par. 125

857 – 40 % # Sort
3/23/00 [illegible] 45 % Rosin wg
15 % par 125

---

858 [illegible] 40 g. # Sort
3/23/00 [illegible] 48 g. Rosin wg
[illegible] 16 g. par 125

---

859 [illegible] ~~48 g.~~ # Sort Sticky
3/23/00 5 g. Rosin wg
17 g par 125

---

860 40 g. # Sort
3/23/00 ~~54~~ g. Rosin wg
18 g par 125

---

861 37 g. # Sort
3/23/00 ~~[illegible]~~ Rosin wg
14 g par 125

862 — 31 g. # 804
3/23/00 85 g Rosin wg
15 g par 125

---

863 30 g " 804
3/23/00 53 g Rosin wg
11 g. par 125

---

864 34 g " 804
3/23/00 53 g Rosin wg
11 g par 125
2 g $MgCO_3$

---

865 34 g " 804
3/23/00 53 g Rosin wg
11 g par 125
2 g $MgCO_3$

866 32 g # 804
3/23/00 Cond 3 g Round wg
1½ g
11 g par 125
4 g $MgCO_3$

---

867 30 g # 804
3/23/00 R 3 g Round wg
Lard 1 g par 125
Globe 6 g $MgCO_3$

---

868 38 g # 804
3/23/00 5 g Drain wg
1½ g par 125
8 g $MgCO_3$

---

870 - This solution was filtered - the material on the filter dissolved in alcohol and the alcohol evaporated off. The residue is resinous and black - sticky + soft.

869. 3/28/00 Digested grease wood #4 with water

---

870 3/28/00 Digested grease wood #4 with NaOH sol.
The sol. becomes brown, on addition of acid the sol. first changes to green then to coffee + milk color and finally reddish which is perhaps nothing apparently our. The odor is strong resembling ~~of a coffee~~ fresh, stronger smelling odor of hippuric acid

871 3/28/00 Digested grease wood #4 in Soxhlet Extractor with Chloroform for 3 hrs.
35 gr roots used.
10% or 3.6 g. of a resinous mass obtained.

re #899

872 - 3/29/00

Digested grease wood + with milk of lime. ~~For~~ a ~~period of~~ 6 hours. Then filtered off the woody material, Decomposed any lime salt and dissolved the excess of lime with HCl - then filtered. Dissolved the stuff on filter in alcohol + evaporated off the alcohol. The residue dark in color and similar to #870 but more fluid and sticky. After a period of 10 days - a crystalline mass appeared

873 - 3/29/00

Treat the stems - 20 g. of grease wood #4 with Chloroform in Soxhlet Extractor for 5 hours. The stem were well pounded in a porcelain mortar.

The residue after the Chloroform had been distilled off weighed 5.5 g. or 27.5%.
Dark in color - a heavy sticky resinous fluid.

See # 901

874 - 3/30/00

Treated 20 g. stems of Grease wood # 4 in Soxhlet Extractor with Carbon bisulphide for 5 hours. The stems were well bruised in a porcelain mortar first. The residue after CS_2 had been distilled off weighed 3.1 g. or 15.6% Lighter in color than # 873. Less fluid but sticky & resinous.

875 3/31/00

Treated 20 g. Stems, were bruised in porcelain mortar in Soxhlet Extractor with Ether for 4 hours, then distilled off the ether. The residue weighed 4 grs. or 20%. The material has the general appearance of # 873.

876. 4/2/00

Treated 20 g. of stem of grease wood "4" from New Mexico in Soxhlet Extractor with Benzol for 4 hours. The stems were well bruised. The Benzol solution was then evaporated and the residue weighed 3 g. or 15%. The general appearance like the others

see # 881

877 4/20/00

Boiled some well bruised stems of grease wood in alcoholic solution of NaOH in a flask connected with a return condenser for 3 hours. The liquid i.e. the alcoholic soda solution, has a very dark color and a pyridine like odor after filtering. The alcohol was evaporated off, the soda solution decomposed with 50% H_2SO_4 and the whole filtered through a paper filter, everything appears to go through. The color and odor somewhat the same as # 870. This liquid mass then heated with CS_2 in separatory funnel - CS_2 evaporated off without separation & the whole boiled with water.

#878 4/2/00

Upon looking at #872 today there appeared to be a separation - one substance is black and sticky while the other appears to be a colorless oil. Warmed up this and then tried to filter off the black material by means of cheese cloth. This does'nt appear to take out all of the black matter. Thought that by dissolving it in alcohol and then filtering through paper might work but the black also dissolves. Upon evaporating off the alcohol the residue is a grayish white solid, when cool it becomes dirty looking and mushy as if it had taken up moisture.

4/7/00. The above has crystallized out in long radiating crystals

#879 4/2/00

Tried to saponify #873 with Caustic soda. Saponification takes place - The resulting compound is a thick liquid dark in color.

\# 880. 4/3/00

Treated 100 g. crushed grease wood - stems & roots - in hot milk of lime containing 100 g. lime for 8 hrs. Filtered through cheese cloth after decomposing with acid. A good strong squeezing was resorted to in order to squeeze through the cloth any oil or resin. A portion of this was treated in a flask connected with a return condenser with benzine. This separated in a separatory funnel and the benzine evaporated. The residue was light in color small in amount and very sticky.

881 4/3/00

The material in #877 that had been subjected to extraction, being very mushy was boiled with water. Then filtered through paper filter. Treated to carbon bisulphide in separatory funnel. Nothing appeared to be extracted, however upon evaporating off the carbon bisulphide, there remained a very small quantity of light colored matter, greasy and paint like.

The water, carrying over the oil and after separating the oil requires 3.3 n Na_2CO_3 sol. to neutralize or .1649 g. Na_2CO_3 or .097 g Na_2O for 100 c.c. of the water distillate, showing presence of volatile acids.

See #900
#902

882 4/5/00

Distilled 50 g. crushed grease wood with water. Used about 1000 c.c. water. A small quantity of oil came over.

883 4/5/00

Distilled the same stem. as in #882 with 5% solution H_2SO_4, more of the oil comes over - towards the end when the heat is raised, the oil is colored brownish.

1% volatile oil

"884 4/5/00

Digested 100 g. crushed stems of grease wood in a Soxhlet Extractor a'la Shingle with Carbon bisulphide. Yield was 10 gr. resinous matter, this was distilled alone, per se, in a small porcelain retort. apparently nothing distilled excepting part of the solvent still contained in it. Upon evaporating the distillate, a substance similar in appearance to the original remained.
The residue in retort had a very disagreeable odor but appears to be thicker consistency than original, black in color.

8785 4/6/00

Distilled, dry, 100 gr. - crushed stems + roots of guaiac wood in iron retort with naked flame. A liquid came over smelling strongly of burnt wood and holding particles of carbon in suspension. This was filtered through cheese cloth and then shaken with carbon bisulphide in separatory funnel - a black disagreeable smelling, somewhat inclined towards oily liquid remains.

resembling the odor when fish + sawdust are distilled

Creosote

#886 4/7/00

Distilled the material that had been exhausted with CS_2 in an iron retort with naked flame. A liquid similar to #885 comes over. The carbon is filtered off and the filtrate treated with Ether in separatory funnel

a The residue after Ether evaporates is a dark - disagreeable pungent smelling oily liquid

b Then with Benzol.
Pure black - some what like the first (a)

c Then with Chloroform
darker in color than Ether (a) thicker and not so strong smelling

Probably all creosote

d Then Benzine - Nothing taken out.

e - Then CS_2

f - Then gasoline

887 - ~~Master~~ cylinders.
4/9/00 99% Reg
1% Carnauba

888
4/9/00 95% Reg.
5% Carnauba

889
4/9/00 93% Reg
7% Carnauba

890
4/9/00 90% Reg.
100% Carnauba

891
4/9/00 85% Reg
15% Carnauba

892
4/9/00 75% Reg
25% Carnauba

893
4/9/00 75% Reg.
10% Carnauba
15% Spermaceti.

894 75% Reg
4/9/00 15% Carnauba
10% Spermaceti

895 65% Reg.
4/9/00 25% Carnauba
10% Spermaceti

896 75% Reg.
4/9/00 15% Carnauba
10% Stearic acid

897
4/9/00 99% Reg
1% Manilla Gum XXXX
The gum will not dissolve

898 Grease Wood
4/10/00 Placed 50 grs in Extractor moistened with NH_4OH and then extracted with ether.
10% Extracted - The extracted material is very fragrant and more liquid & oily, not so resinous but sticky.

899 — Grease wood
4/10/00 Benzoic acid in it?

Dissolved the crystalline ppt # 872 which I think is Benzoic acid in hot water to recrystallize —

Took 50 gms bruised stems and treated them with slaked lime by boiling

900 4/10/00

Tested distillate-water in ~~8~~ 3 with $BaCl_2$. - No ppt

Conc. the entire distillate by redistilling - if volatile acid is in it - it will readily be carried over with Steam.

Then treated conc. distillate with following reagents :- $CaCl_2$, $CuSO_4$, NH_4CNS. K_4FeCN_6, K_3FeCN_6, K_2CrO_4 $SnCl_2$, $(NH_4)_2CrO_4$, NH_4Cl, $HgNO_3$, $PtCl_4$ $U(C_2H_3O_2)_4$.

None gave a ppt in the cold.

In the hot, K_4FeCN_6, K_3FeCN_6 and $HgNO_3$ gave a slight turbidity while the odor of prussic acid was noticeable in the two former.

901 4/15/00

Treated the Extracted material obtained in # 874 with the following solvents

a - alcohol. - Filtered off insol. portion Then melted it plat. lid - a resinous solid - sticky.

b - Ether - Completely soluble - filtered through animal charcoal - no change

c - CS_2 - Completely soluble

d - Benzol - completely soluble

e - Benzine - very little

f - gasoline - very little.

g - water - apparently nothing

h - Kerosen - very little.

902: 4/11/00

Treated the stem left after #883 with the following solvents successively. allowed each 1 hr.

903 - 4/11/00

Petroleum - nothing extracted

904 4/11/00

Gasoline - nothing extracted

905- 4/11/00

Benzine. - takes out a colorless oil which dries up upon standing exposed.

906 4/11/00

Alcohol - a black liquid resinous mass which upon standing separates like an oil and a resinous body.

907- 4/11/00

Benzol.

Not so unlike # 906 but about $\frac{1}{4}$ the quantity and not ~~so~~ black

908 4/11/00
Carbon bisulphide -
Small quantity of light colored sticking mass which dries up to a gum like body

909 4/11/00
Ether
a substance that dries up to a sticky oily powder

910 - 4/11/00
Chloroform
Similar to # 908 but not so gummy.

911 - 4/11/00

Acetic Ether.

Somewhat like in appearance #907 but more oily and yet unlike " 906

912 4/11/00

Moistened with ammonia and then extracted with Ether.

The ether then extracts nil.

Special cylinder for Wurth

#913 - 240 gr Syrian asphalt
4/17/00 ~~1~~ 8 g Soda (caustic)
~~14~~ g Carnauba

#9.14 250 pts carnauba
4/18/00 1 pt soda (caustic)
175 Syrian Asphalt
very brittle & hard - difficult to shave.

#915 95% #914.
4/19/00 5% Paraffine

#916 95% 914.
4/19/00 5% Ceresine

917 95% #914
4/19/00 5% Japan wax

---

918 90 pts Syrian Asphalt
4/19/00 100 pts Carnauba
3 pts Caustic Soda

very thick - not as brittle as #914

gives good record but scratchy

---

919 90 pts Syrian Asphalt
4/20/00 150 pts Carnauba
3 pts Caustic Soda

920 200 pts Carnauba
4/20/00 100 pts Syrian Asphalt
10 pts par. 130

921 100 pts Carnauba
4/20/00 100 pts Syrian Asphalt
20 pts par 130

922 100 pts Carnauba
4/20/00 150 pts Syrian Asphalt
20 pts paraffine 130
Sticks to mould when pressed

923 - 4/20/00

100 pts carnauba
200 pts Syrian asphalt
25 pts paraffin/30

---

924 4/24/00

30 pts Syrian Asphalt
1 pt Caustic Soda
40 pts Carnauba

---

925 4/24/00

30 pts Syrian Asphalt
1 pt. Caustic Soda
60 pts Carnauba

926 30 pts Syrian Asphalt
4/24/00 1 pt Caustic Soda
70 pts Carnauba

---

927 30 pts Syrian Asphalt
4/24/00 2 Caustic Soda
40 Carnauba

Stearic Acid 700 pts
Soda 154 pts
used in 928-929-930.

Cheap Wax

#928 70 pts Stearate Soda
7/00 3 " Mg CO3
1 pt Carnauba
20 " Crystal wax
10 " paraffine

929 70 pts Stearate Soda
7/00 3 " MgCO3
1 " Carnauba
1 pt oleic
20 rosin wg
10 Crystal paraffine

#930 - 40 pts Stearate Soda

5/7/00 35 " Res. Ca. 200:10

25 " paraffine

2 " $MgCO_3$

---

931 added Paraffine to

5/14/00 a naphthaline solution

of resinate of iron. This

did as expected - threw

out the resinate of iron

and would not dissolve

in it or with it.

932
5/14/00 added flowers of sulphur to a mixture of stearic acid and W. W. rosin
the sulphur dissolves but the mixture is a soft sticky mass

933
5/14/00 added flowers of sulphur to a melted rosin W. W. ~~a mixture of stear~~
Any amount of sulphur goes in — see #937 etc

934
5/14/00 Added Flowers of Sulphur to Naphthalin.

No action whatever

935
5/14/00 Sulphur to Stearate of Soda 700:154

Action very slow and scarcely [illegible]% was absorbed during the entire afternoon

936
5/14/00

Sulphur to Regnocer.

The note under #935 applies here. In both cases the color became quite dark.

937
5/15/00

Rosin with various % of Sulphur.

10%	Sulphur	Sticky
5%	"	
15%	"	
20 "	"	
25 "	"	
30 "	"	
35 "	"	best
40 "	"	
45 "	"	N.G.

938
5/15/00 Burgundy pitch & Sulphur.
Sticky

939
5/16/00 Sulphur & paraffin
5% Sulphur

10%

The sulphur slowly dissolves but the resulting compound is indifferent to resinate of iron in both cases.

940 Sulphur & Ceresine
5/16/00 5% Sulphur
10% "
The sulphur and reamatto of iron are indifferent in both cases.

---

941 Sulphur & Wht ceresine
5/16/00 5% Sulphur
5/17/00 10% "
15% "
20% "
25% "
30% "

Sulphur does not chemically combine.

It comes out upon standin

942
5/17/00

50% #937-35%
50% Stearate Soda 700:152

943
5/17/00

60% #937-31%
40% Stearate Soda 700:152

944 40% #937-35-
5/17/00 60% Stearate Soda

945
5/17/00 5g. resinate of iron
added to #941-10%

The sulphur comes
out upon standing

946
5/17/00 10 g. Humate iron
added #941 - 15%.

See #945

947
5/17/00 15 g Humate iron
added to #941 - 20%.

See #945

948
5/18/00 Castor oil & sulphur.
The oil darkens in color but other wise there is no change.

949
5/18/00 Linseed oil & sulphur

darker, apparently no Chemical reaction.

950
5/18/00 Oleic acid & sulphur

Acid darker & thicker

951
5/18/00 Cottonseed oil & sulphur

No change, oil has in suspension golden crystals which resemble sulphur.

952
5/18/00 Rosin & liver of sulphur

Sticky - about the same as with plain sulphur

953
5/18/00 Rosin & sodium penta sulphide.

very hard to react & very slow if any reaction, otherwise same as #952

954 Syrian Asphalt & Sulphur
5/18/00
The Syrian Asphalt has ~~most too~~ high a melting point although the sulphur apparently enters. See # 958

---

955 Syrian Asphalt & lots
5/18/00 of sulphur.

See # 954 then
#959

956 Syrian Asphalt &
5/18/00 Sodium pentasulphide

See # 954

---

957 Rosin oil + sulphur
5/18/00

oil much thicker
and no rosin smell at
all. - darker

958
5/18/00 50 pts Syrian Asphalt
50 pts Carnauba
5 pts Sulphur.

Melting point [illegible]

959
5/18/00 50 pts Syrian Asphalt
50 pts Carnauba
5 pts liver sulphur

Apparently no change

960
5/18/00 75 pts Carnauba
50 pts Syrian Asphalt
5 pts Sulphur

---

961 linseed oil + liver of
5/19/00 sulphur

Stiffer than "949 otherwise
unchanged

962 linseed oil + sodium
1/19/00 pentasulphide

See #961

963 Castor oil + liver of
1/19/00 sulphur

No different than
#948

964 Castor oil + Sodium penta
1/19/00 Sulphide

No reaction.

---

965 Rosin oil + Flour of
1/19/00 Sulphur

Thicker than #957

966 Rosin oil + Cadmium
5/19/00 penta sulphide

No Change

---

967 Cotton seed oil
5/19/00 + Liver of sulphur

No Change

Cylinders for work

968. 90 pts Syrian Asphalt
1/21/00 100 pts Carnauba
3 " Caustic Soda
5 " paraffin

969
1/21/00 90 pts Syrian Asphalt
100 " Carnauba
3 " caustic soda
5 " blk ceresin

970 90 pts Syrian Asphalt
7/21/00 100 " Carnauba
3 " Caustic Soda
20 " Stearate Soda 700:150

Cheap wax

971 80 pts Syrian asphalt
7/21/00 50 " paraffin
5 " Sulphur.

The asphalt & paraffin will not mix before the melting point of the asphalt is reached - the paraffin volatilizes and what little is combined is insufficiently [illegible] the S.

972
5/21/00
50 pts Syrian Asphalt
50 pts paraffine
5 " liver of sulphur

See #971

973
5/21/00
50 pts Syrian Asphalt
50 " paraffine
5 " , Sodium penta sulphide

See #971

974 50 pts Bitumen
5/21/00 50 pts paraffine
5 " Sulphur

975 400 g. Cppproroom
5/22/00 "Stearate Soda 700:112

a - 40 The fact here is that
b - 80 the mixture cools before
c - 120 solidifying
d - 160
e - 200

f - 20 g. Stearate Alumina

g - 10 g. paraffin

c - d - e - f and g best
inclined to be more sticky
than others

976 400 g. [illegible]

5/22/00 Paraffin

a- 20 g

b- 40 g

c- 60 g.

---

d- 20 g Mg Stearate 100:10

e = 20 g. Carnauba

f = 20 g. Syrian Asphalt

g = 5 g Caustic Soda

---

d - e - f and g are

[illegible]

977 400 g. [illegible]
5/21/00 Creame White.

a - 20
b - 40 - not homogeneous
c - 60

d. 20 g resinate iron
very frothy
e - 20 g Stearate Zinc 100:55
f. 10 g carnauba

c - e and f are best
but a trifle too soft

978 400 g Copper rosin
5/27/00 Blk Ceresine
40
60

Blck ceresine is n.g. to be used – the copper rosin itself being inclined to froth also the Blck. ceresine – the resulting mixture is one large froth Hence must leave Blk ceresine out entirely.

979 400 g. Cpp pruoroin
5/27/00 Regnocer

a = 40 g.
b = 80 g.
c = 120 g
d - 160 g.
e - 200 g
f = 240 g.

980
5/22/00 300 g Copper rosin
150 g Stearate Soda 700:150
Stearate zinc

a 20 g
b = 40 g
c = 60 g
d = 80 g

up to 981 including with Oppsworosm the resulting mixtures about the same cutting nice and shavings apparently dry - but becoming sticky if allowed to remain in the fingers - the wax is somewhat brittle and at times tenacious, depending upon the temperature - a slight increase of temperature causing stickiness.

#982 - #991 are a few that appear

981 400 g. Oppsworosm
5/22/00 Ricycluar

~~981~~ - a 40 g -
b = 80 g
c = 120 g.
d - 160 g.
e = ~~200~~ g
f = 240 g

best but with the faults mentioned above. Cylinders will be made and a list given them for scratchiness [illegible].

An attempt will be made to overcome this liability to change with any rise of temperature by doing with different gums etc. A mixture of Stearate Soda and Copperoin will be used as base as that mixture has a fine melting point.

---

982 400 g. Copperoin
5/21/00 120 g Stearate Soda 700:154

---

983 400 g. Copperoin
5/21/00 160 g. Stearate Soda 700:154

and less liable to froth than the others. If the temp of the cppp-wax-rosin ~~be raised~~ above 150° C. ~~frothing~~ commences ~~with~~ accompanied by decomposition which is noticeable by the strong odor of H_2S CS_2 and the sulphur compounds of Carbon and hydrogen besides volatile organic sulphur

984
1/27/00
400 g. cppp-wax-rosin
200 g. Stearate Soda 700:154

985
1/24/00
400 g. cppp-wax-rosin
60 g. paraffin
20 g. Stearate Mg. 100 : 10
20 g. Carnauba

986 400 g. Cpppurorosin
100 g. paraffine
1/24/00 20 g. Mgstearate 100 : 10
20 g. Carnauba
20 g. Syrian Asphalt

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987 400 g. Cpppurorosin
40 g. white Ceresine
1/24/00

988 400 g. Cppperoresin
60 g. White Ceresine
1/24/00.

989 400 g. Cppperoresin
60 g. White Ceresine
1/24/00 20 g. Resinate Iron

990 400 g. coppworosin
1/24/00 60 g. White ceresine
20 g. resinate iron
20 g. Stearate zinc 100:55

991 400 g. coppworosin
1/24/00 60 g. White ceresine
20 g. resinate iron
20 g. Stearates zinc 100:55
40 g. Carnauba

Too much froth
impossible to mix without

792
100 pts < 400 pts Cupprammonium
120 .. Stearate Soda

[illegible]/00 5 pts Gum Arabic

Not completely dissolved

793
100 pts < 400 g Cupprammonium
120 .. Stearate Soda

[illegible]4/00 a - 5 .. Gum Arabic
b - 10 .. ..

994 100 pts < 400 g Opoponax / 120 g Stearate Soda
1/24/00
a – 5 pts Gum Tacamahac
b – 10 " "

995 100 pts < 400 g Opoponax / 120 g Stearate Soda
1/24/00
5 " Gum Amber

996
5/24/00

100 pts < 400 g [illegible]
120 g Stearate Soda

5 pts Gum Myrrh

997
5/24/00

100 pts < 400 g [illegible]
120 g Stearate Soda

5 pts Gum Ammoniacum

998
5/21/00

100 pts { 400 [illegible]
120 Caustic Soda
5 .. Gum Euphorbium

very frothy.

999
5/21/00

100 pts { 400 [illegible]
120 Caustic Soda
5 .. Gum Sandarac.

Tr. continuation
RC N-0015-25

Notebook, N-00-05-25

1900

Phonograph Cylinders
Book # 1.

John Clarence Strugle

1000 100 pts < 400 pts Opp[illegible]
5/25/00 120 Stearate Soda

5 pts Gum Benzoin

1001 100 pts < 400 Opp[illegible]
5/25/00. 120 Stearate Soda

5 pts Gum Opopanax

Not completely dissolved

glassy.

1002
5/21/00

100 pts < 400 Opopwrrosin
120 Stearate Soda

5 pts Gum Senegal

Does not dissolve just swells up.

1003
5/21/00

100 pts < 400 Opopwrrosin
120 Stearate Soda

5 " Bonair Aloes

1004 100 pts < 400 Opoponorum / 120 Stearate Soda
5/25/00

5 " Gum Olibanum

1005 100 pts < 400 Opoponorum / 120 Stearate Soda
5/25/00

a - 5 " Gum Mastic

b - 10 " " "

1006
5/25/00

100 pts < 400 Copper [illegible]
120 Stearate Soda

a.- 5 pts Ammon
b.- 10 " "

Glassy.

1007
5/25/00

100 pts < 400 Copper [illegible]
120 Stearate Soda

[illegible] pts Gum [illegible]

1008
5/25/00

100 pts < 400 pts Copper rosin
120 " Stearate Soda

5 pts Gum Sagapenum

1009
5/25/00

100 pts < 400 Copper rosin
120 Stearate Soda

5 pts Gum Kino

1010
5/25/00 100 pts < 400 [illegible]
120 Silicate Soda

5 pts Gum Guttar

Does not dissolve but changes mixture.

1011
5/25/00 100 pts < 400 [illegible]
120 Silicate Soda

5 pts Gum Assafoetida

1012
5/25/00

100 pts 400 Oppbimrosin
120 Stearate Soda

5 pts Gum Dammar

1013
5/25/00

100 pts 400 Oppbimrosin
120 Stearate Soda

5 pts Gum Sanguis Draconis

1014 100 < 400 Copper rosin
5/25/00 120 Stearate Soda.

5 pts Gum Amalgam

1015
5/25/00 100 < 400 Copper rosin
120 Stearate Soda.

5 pts Gum [illegible]

Does not dissolve but gives
a new property to mixture

1016
5/28/00 100 pts < 400 [illegible]
120 Stearate Soda

5 pts - Oleate iron

DJF Stickey

1017
5/25/00 100 pts 100 [illegible]
120 Stearate Soda

5 pts [illegible] Ca

DJF Stickey

1618
5/28/00 100 pts 400 [illegible]
120 Silicate Soda

5 pts Cottonseed oil

Soft Slicky

1619
5/28/00 100 pts 400 [illegible]
120 Silicate Soda

6 pts Rosin oil

Soft Slicky

1020
5/25/00 100 pts < 400 Oppermann
120 Stearate Soda

5 pts Castor oil

Soft Sticky

1021
5/[illegible]/00 100 pts < 400 Oppermann
120 Stearate Soda

5 pts [illegible] oil

Soft Sticky

1022
5/28/00

100 pts < 400 Cuprammon
120 Ammonia Soda

5 pts paraffine

Soft Sticky.

1623
5/31/00

We [illegible] treated [illegible]
various [illegible]
[illegible]
The best [illegible]
[illegible] treatment with S.

5%
10%
15%

The asphalt goes in very
slowly and not completely
Still sticky and not as
hard as plain rosin

1024

[illegible] with

[illegible] proportions of

[illegible]

[illegible]

[illegible] S.

5%

10%

The asphalt melts and after raising temp, slowly goes in but not completely

Still sticky but not as hard as plain rosin

1025

5/31/60 Bound up #1023 - 10% soft Mexican Asphalt with sulphur

5% - Temp. must be kept down or decomposition + froth - Sticky

10%

15% - Sticky.

More inclined to froth than with plain rosin.

See #1028

1026

5/31/00 tried up #1024 – 10%

Hard Mexican Asphalt

with Naphtha

5% Hemp must be kept

down or decomp & froth – sticky – brittle

this harder than 1026 – 5

10%

15%

more inclined to froth than plain

resin

[illegible] a great [illegible] of NO_2 accompanied
[illegible] much frothing [illegible] quantity,
[illegible] makes it unpractical.
#1027 & #1028 afterwards settles
down to a smooth surface

1027
6/1/00
[illegible]
[illegible] % of
Cuban [illegible]

5% [illegible]

then 5% Sulphur to the above
then
5% Cuban more
" 5% Sulphur
" 5% Cuban
6/8/00 - 5% Sulphur.
6/12/00 - 5% Cuban
6/1/00 HNO_3
20 pts Sulphur
20 " Sulphur

1028

6/1/00 Continuation of #1025
dosing with various things

5% Cuban Asphalt
5% Sulphur
5% Cuban Asphalt
6/2/00 5% Sulphur
6/4/00 5% Cuban Asphalt
5% Sulphur
6/5/00 HNO_3

20 pts Sulphur
20 " Sulphur

[illegible] some time to Harden - too long

1029

6/4/00

100 pts Rosin wg.
100 " Prime Cuban Asphalt

10 pts Sulphur

10 pts Sulphur

10 pts Sulphur

40 " Stearate Soda

6/5/00

HNO_3 -
One big froth.
nothing but bubbles.

1030
6/4/00 100 lbs rosin wg
200 " Prime Cuban Asphalt

10 lbs Sulphur
16/5/00 30 " "
40 " "
40 " "
40 " "

N. G. too much asphalt
bad melting point and
full of air holes -

Too much sulphur + asphalt →

1031

6/5/00 200 ~~gts~~ rosin wg

20 c.c. Sulphuric acid

6/6/00 100 g. Sulphur

50 " "

50 " "

50 " "

50 " "

6/7/00 50 " "

6/7/00 25 g. Cuban Asphalt

25 g. Cuban Asphalt

6/8/00 50 g. Rosin wg

1032

6/5/00 200 grs rosin wg.

70 c.c. HNO_3

6/6/00 50 g. sulphur

N. G.

Nothing but

froth

1033

6/13-14/00 Electrolysis of Sodium Humate.

~~a~~ In alkaline sol.

a - acid deposited on positive pole

b - " remaining in sol.

In water Solution

c - acid deposited on positive pole

d - " remaining in sol.

1034
6/13-14/00

Partial Saponification of rosin

a - first portion acids

b - second " acids

1035
6/18/00 10 pts rosin
25 " Sulphur

The above was intimately mixed then placed in hardglass tube and sealed — heated to a temperature of 150 °C for 3 hrs

The proportion of Sulphur too great - there being a large excess the Sulphurated rosin being entirely different from that made in pan this being transparent & more sticky & softer -

1036

6/19/00 25 pts rosin
10 Cuban Asphalt
5 Sulphur.

Intimately mixed & heated in sealed tube for 3 hrs at temperature of 155° C. This was raised to 180° - 190° C when explosion occurred.

1037

6/19/00 25 pts rosin
5 " Sulphur

Heated for 6 hours at temperature of 150 – 160° C. No difference from #1035. Nice attempt to raise temperature. First one blew up at temperature of 180° C. Today 6/20/00 safe but did not get above 170° C at any one time.

1038
6/20/00 rosin &
zinc chloride heated in
sealed at temperature of
150 - 160° C for 6 hours.
a change takes place, the
general appearance resembles
wood tar pitch but it is very
sticky and is about half
way between rosin oil &
rosin.

rosin & zinc chloride in
various proportions in
pan - same as above - dissolved
out $ZnCl_2$ with water - residue
sticky

1039
6/21/00
Rosin + conc. HCl in
sealed tube.

Gone up

1040

6/21/00 Eosin + dilute HNO_3

in sealed tube

Gone up

1041

6/21/00 rosin + dilute H_2SO_4
in sealed tube

Done Ea

1042
6/23-25/00

Chlorinated naphthalene and sodium resinate in sealed tube. Kept at temp 140 - 150 °C. for 7 hrs. The mass has a homogeneous appearance darker in color and rather fluid.

1043
6/25/00
/23

Chlorinated Naphthaline
and sodium stearate
in sealed tube - Soft
greasy ~~jelly~~ compound resulted
after heating for 7 hrs at
140° - 150° C.

10/25/00

1044.

Oleic acid treated with
HCl gas and stearate
soda in sealed tube
Heated for 7 hours in
vacuo at temperature
of 140° - 150° C. - Sofr.
Greasy mass.

10245 -

6/25/00

50 pts Stearate Soda

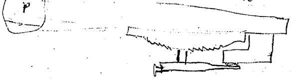
50 pts Rosin treated with glyc.

This is not sticky apparently but soft - now to harden up.

Notebook, N-03-10-09

Oct 9/03

10/1000 Soft Rubber Edge diaphram
alum Center 3/1000 thick



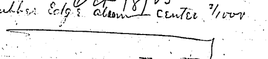
Oct 17/03

5/1000 Rubber Edge aluminum Center 3/1000 thick
Soft

$\frac{1}{10}$" wide 20/1000 40/1000 50/1000 50/1000

Oct 18/03

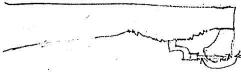
5/1000 Soft Rubber Edge alum center 3/1000



$\frac{1}{10}$" wide 15/1000 50/1000 50/1000 50/1000 thick

Oct 19/03

5/1000 Soft Rubber edge 3/1000 alum center



bamboo

1/10" wide 20/1000 thick

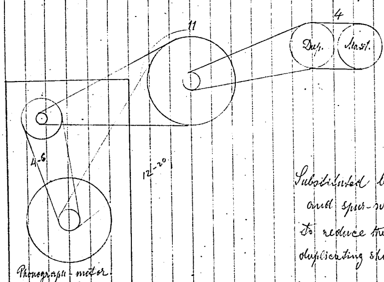
Oct 20/03

Notebook, N-05-08-15.2

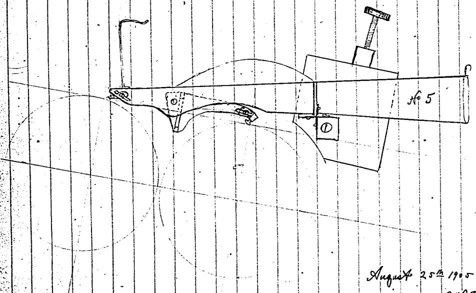
Room 18 S.O. # 1706

C. Wurth

August 15. 1905



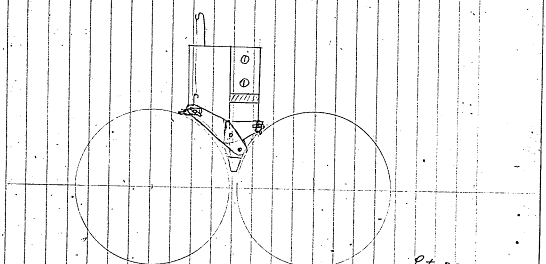
Substituted belts for worms
and spur-wheels—
to reduce the speed of the
duplicating shafts to 4 r.p.m.



August 25th 1905

C. Wirth

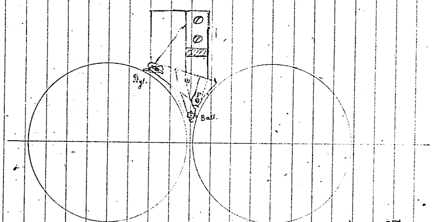
Hermann Volke



Sept. 22. 05

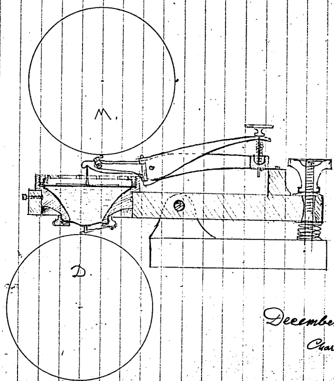
C.W.

H.W.



Octob. 9. 05

C.W.
H.W.



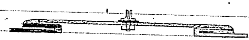
December 14th 1905

Charles N. Wirth

January 12th 1906

Made rubber-packing rings more flexible.

C.W.



February 06.

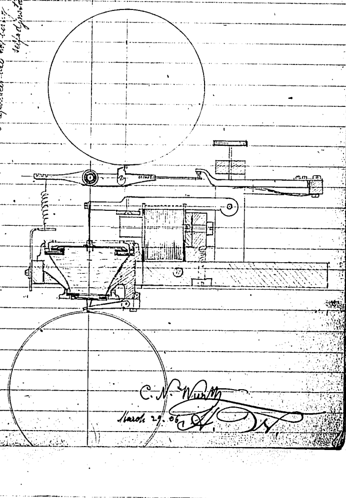
Prolong the life of masters by applying ice-water on the reproducer-ball for duplicating.

C.W.

March 29th 1906.

Rough experiment with Electro-magnetic applyance in combination with hydraulic Duplicator

Not delicate enough!
The reproducer-ball not being self-adjustable



C. N. Wurth

March 29. 06

May 16: 06.

B. Diaphr. Drumhead skin 5/16 Diam. .008 thick
Horn #6. Stylus .010

B.1. Sound Entrance in centre. rubber-cushions
B.2. " " cushion brassring 1/16 thick
B.3 " " " " "

June 1.st

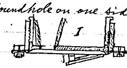
C. Diaphr. Parchement .008. Diam. 5/8"
Rec. Stylus .027. Rep. ball .025.

C.1. Diaphr top #2 Diaphr. loose
~~C.2~~ " " ~~3~~ " ~~stretched tight~~
6/12) C 3 a & b. " " " " " " loosened a little
C 3 c. " " 4 " "
C 4. a " " " 3 " quite loose 1/16 brass cushion
" b. " " " 1 " " rubber cushion
C 5 " " 2 Diaphr tightened slightly.
a D. horn, b #6 horn.
C 6 Diaphr. Banjo-head-skin .007 horn #6.
a slightly loose, b. stretched
C 7 ido a Toy horn, b #6 horn. Very slightly stretched
C.2. Diaphr. Parchement .006 steel-stylus. stretched slightly
Diaph. top #4

June 21st 1906

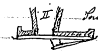
D.1 Diaphr. Banjo-head skin .0075 , 1,350" Diam.
Soundhole on one side I

Diaph. tight.



June 22.

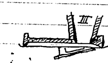
D 2 a The same with sound-hole at II

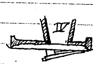


Soundhole II

D2. b. Sound hole at IV

D 3 Soundhole III
a loose, b slightly tight.





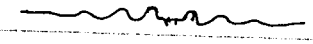
D 5 a. Toy-horn, b. #6 horn.
Soundhole #2 Stylus .0385 . Diaphr. shellacked.

D.6. Horn #6 Soundhole in centre, slightly tight.

D 7 " Soundhole # II , more shallow
Diaphr. stretched — O.K

D.8 " " #2. a little loose
" 9 " " " stretched more } Stylus feet low.
" 10 " " " " a little less stylus high
" 11 Stylus a little higher than 8 & 9.

June 29th 06.

E. 2 Diaphr. Celluloid .011 corrugated deep in centre, shallow  towards circumference, soundhole # IV

a. #6 horn b. Toy-horn. N. 9.

July. 10. 06.

Diaphr of Gossamer-cloth and pine-wood $1\frac{5}{8}$" Diam. with tightening arrangement and spring to pull ap.

F. 1. Diaphr. and spring tight.

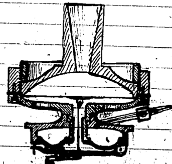
2. Diaphr. a little loose, spring tight. N. 9.

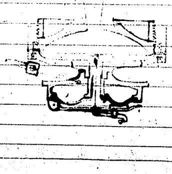
July 20. 06.

Speaker with air-cushion in place of weight. Diaphr. Banjo-head skin 1.550 (ins) Diameter

July 26. 06.

Replaced skin diaphr by 0.003 steel. reg. diam. O.K.

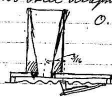




August 1. 06

Made recorder with .003 steel diaphr.

sound-hole Excentric 3/16" O.K.



August 2^de 06

Recorder with .003 steel diaphr.

sound-hole Excentric 3/8" O.K.

stylus fastened on 3 legs

August 10. 06.

Automatic recorder with steel diaphr. .003

shellacked on both sides not very loud

Automatic recorder with .002 nickel-diaphr.

C.11. very sensitif blasts a little

Soundhole 3/16 excentric.

August 17. 06. Automatic recorder

with diaphr. of soft white-pine .013 thick

shellacked on both sides.

without rib across the grain it blasts

with rib has good tone, but less loud

C. 13.

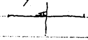
1906

Sept. 10th to 24.

Took records on Steinway-Piano in Room 13 (31)
with automatic Diaphr. .003 Steel.
Rienzi overture: F 1.
Sept. 25. Sent Autom. Recorder with .003 Steel Diaphr. to W. Miller.
" 28. gave the arm of Aut. Rec. " "

Sept. 28. 1906.

Diaphragme of .006 Charcoal-iron
filed down to .004 towards the Edge
Stylusholder a small post a little out of centre of Diaphr. Stylus .010 O.K.

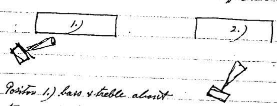


Oct. 10. to 17. Experiments with two horns
" 17. 2 Larks. Steel. Diaphr. ,003, Styl. 040. (Same as Autom)
large 54" black horn and split paper horn.
high notes good, bass weak.
Oct 17. Tyrol. Nightingale. C.17 Diaphr of Drumhead-skin
with stretcher, large 44" paper-horn.

Oct. 19. Sent to W. Miller 2 = .010 Styl. 4 = ,012 Styl.
1 = .015 " 1 = ,010 Ball
2 = .030 "

Octob. 21. 1906

Diaphr of ,002 Nickel. corrugated; Styl. 35
Diam 1 1/16"
1.) E.12 Horn #6. Phonogr on floor on treble-side of piano.
2.) D.15. Phonogr on stand 3 ft. high, pointed towards bass-side. a horn #6. b horn #10 (40")



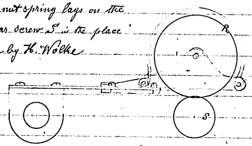
Positon 1.) bass & treble about the same intensity.
2.) treble notes much more penetrating.
No difference between 1/4 and 3/8 hole in Diaph-top.

Oct. 24 - 27. Diaphr of telephone-carbon, on regular size O.K. 1/4" tone too thin & metallic.

Nov. 1-6. 06. Diaphr. of ,002 Nickel mounted in automatic & recording arm with leading ball reproducer-Diaphr. ,002 steel. Reproduces faintest dictation very clear. In commercial phonogr. without leading ball there is too much scratch.

Novemb. 13. 06. Device for reproducing 200 thread records on Home-phonograph with 100 thread-screw — A Roller R mounted on the feed-nut spring lays on the regular screw S in the place

Made by H. Wolke



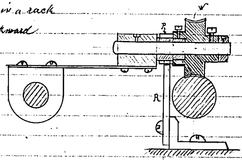
of the feed nut. On this roller is cut a left hand screw thread 100 threads per inch. The diameter of this roller must be double that of the screw.

Explained to me
November 17, 1906.
Frank L. Dyer

Novemb. 11 – 06.

Device for recording and reproducing 200 thread records on Phonographs with the regular 100 screw.

A worm 3/4" Diam. with a pinion 3/8" D.
Engaging in a rack
moves backward



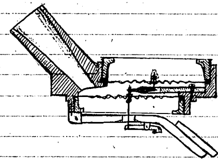
Made by C. Wurth

A worm 7/8" Diam. a gear-wheel of exactly the same pitch-line Diam. 48 pitch 30 teeth; an Idler of any convenient Diam. a rack with 48 pitch.
moves forward 200 rev. per inch.

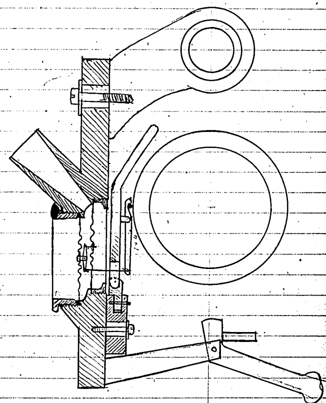
Dec. 1906 S.O. # 1887

Experimenting on multiple diaphragms for Reproducers.

Dec 6.

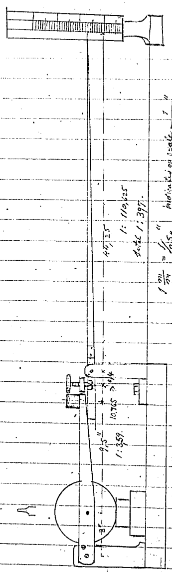


Dec. 31st 1906.



January 1907 to May 1907

Experiments on loud reproducers



1 m/m = 1/25.4 " Indication on scale 1/9982 "

Weights #1) 3 oz 230 gr on End of Lever 12 oz 288 gr
2) 4 " 100 " " 15 oz 79 "
3) 5 " 350 " " 20 " 272 "
4) 12 " 43 " (= 2 lbs 11 oz)

1907. May-June S.O. # 1925

Hard-Wax Experiments

Regular black master Wax.

~~alone no weight~~			Reg. Wx with 10% Lamp-black ground in for 2 hs.	
0	15.2 m/m on scale		0 –	46 m/m on scale
W. #3	23	at 9.30 AM	W. #3. 9.47 AM	54
	24	" 31	48	55 1/4
	25	" 32	50	56.1
	25.5	" 33	52	56 1/3
	25.75	" 34	9.57	57 1/4
	26.25	" 40		

17% Lamp-black.		25% Lamp-black	
(no weight) 0 –	28	0 –	28
#3 Weight 10.2 o'cl.	33 1/2	W. 10 14 AM	35
10.4	35 1/4	18	36 3/4
10 6	35 3/4	20	37 1/2
10 12 AM	36 3/4	10 26	38 1/3

33% Lampblack		50% Lampblack	
0 –	28	0 –	29 m/m
W. 10 32 AM	34	with W. at 10 48 AM	35
" 34	36	" 50	37
" 36	36 1/3	" 53	38 1/4
10 42	37	" 58	39
10 45	37 1/4	11 15	40

June 10-11 '07

#7.A) 66% dark Carnauba-wax 12% light Carnauba 12% lamp black

0. 22 73° 0-15

(1+3) W	29.5	4.28	W÷3	16.75	4.42
	30.25	4.30		17 –	" 4.3
	31 –	" 32		17.25	" 4.5
	31.5	" 35		18.	" 52
	32.	" 38			

#8A 75,9% Light Carnauba, 15,8% white master Wx and 10,3% Prussian blue

73°

Weights #1 & 3.

0. 27,75

W. 1&3.	37.5	5.10
	38	5.11
	38.75	5.12
	39.25	5.14
	39.75	5.16
	40 25	5 20
	41 –	5.22

#9 A.) L. Carnauba 16. Gum Copal 17 Pr. Blue #4 ½

Will not mix

N.G.

#10. N.G.

#11A Reg. Bl. Wx 25% Carnauba 50% Chalk 25%

N.G. Porous.

#12A. Reg. Wx 25% Carnauba 50% Vienna lime 25%

N.G. Porous.

1) Stearic acid 10 drats Acetate of lead 2½ drats

2) St. ac. 8 drats Ac. iron 1 dr. not hard
3) " " " " ½ " not hard
4) St. ac. 8, Carnauba 4, Ac iron 1
5) St. ac 8 Carnauba 4
6.) " 8 " ~~4~~ Acct curr. of amon 1
7.) " 6 3 Chrom 1½ I, II, III,
8.) " ~~10~~ 12 " 3 " Alluminum ~~2½~~ 3, I II III
9. " 6 D. " 1½ no acetate
10. " 10 " 0 Acct. Alluminum 2½ ~~I II~~
11.) " 12 0 Zinc 1½ I II
12. " 18 0 2 Acct Magnese I II III
13.) " 4 " 1 mixed with # 12 II
14.) " 13 0 Acct. copper 3 I II
15.) ~~8~~ 8 0 " lithium
16.) 20 " nickel 5
17 cobalt
18 Soft & brittle. 7 not hard but brittle
I
19
20 " 12 1 Acct Magnes. Acct. Iron ½

21.) 20 Stearic Ac. 10 D. Carnauba 2 ~~½~~ Acct. Magnes.
heat St. Ac. & Acct. Magn first then add Carn.
cracks in moulding. not very hard
22.) 16 St. Ac. 2 Acct. of Magnes. 1 Ac. of iron
add ~~#~~ 16 reg. bl. mast. Wx.

23.) St. Ac, Acct. Magnes, Cerosin, red gum ?

24.) Stearate of Magnesium & gum copal

25.) " " " Shellack

26.) 20 Stear. Ac. 3 Acct. Magnes. 6½ Shellack

27 10 " " 1 " ~~2~~ 1½ "

28. 5 " ½ " " Gum Amber. (Will not
(Dissolve)

29. " " " " " Gum Sandarac

30. 8 St. Acid. 1 Acct. Magnes. Gum Damour
(Stearin)

31.) " " Gum arabic
will not dissolve

32.) 10 Stearin 1½ Acct. Lead 4 Syrian Asphalt
will not come off mould

June 21. 07

W. 2 & 3 80° | 80°

# 27 – 0 –	17.–	# 13 0 –	17
+W. 10 – 24	27.–	10.55	43.5
" 25	29	56	46.5
" 26	30.5	57	47.75
" 27	31.25	58	48.5
" 28	31.25	59	49 –
" 30	32.50	11.01	50
" 32	33	3	50.3
" 36	34.	7	51
–W. 29	(5)	–W 46.75	(4.25)

Reg. M. Wx with 17% lamp black		St. of Barium	
0 –	25.75	0 –	21
+W. 11-15	42.50	+W 11:34	33
" 16	45 –	" 35	37.75
" 17	46.50	" 36	39.50
" 18	47.50	" 37	41.50
" 19	48 –	38	42.25
21	49 –	40	43.50
23	49.50	42	44.50
27	50.50	46	46. –
–W 44	(6.50)	–W 41.50	(4.50)

June 22. 07

(# 33.) Stearin 10. Acet. Lead 2 Shellac 2. Gum Copal 2
(not made) Gum copal will not dissolve.

34. Stearic Ac. 8. Acet. Lead 2 Shellac 2

35 St. Ac. 8 Acet. Magnes. 1½ Sulphur 3
D. Carnauba 3.

(June 24) # 36.) St. Ac. 9. Acet. Magnes 2 Sulph. 1 Carnaub. 1½
Hard but very brittle, sandy.

June 25 # 37 Stear. Acid 9. Acet. Cobalt 2. Very fogy

38 Stear. Acid 8 Acet. Cobalt 1½ Carnauba 1 Ceresin 1

27) " 39. " " 8 " " 1½ Shellac 1½

40.) " " 8½ " " 1 " ½

41.) " " 8. " " Magnes 1 W. Ozokerite 3. Shellac 1

28.) 42.) 50% Reg. Wx. 50% Litharge, ground 2 hs

43.) 67% Reg. Wx 33% Zinc-dust.
ground 2 hs

29.) 44.) 67% Reg. Wx 33% Carbonate of Lead
Stirred 3 hs.

July 45.)

June 24 07 78°	June 25. 90° partly in old rut	98° in new spot.
# 35. 0-17	# 35 0-8	# 35 0-18
+W. 2.3. 11-38 31	+W. 2.28 - 22	W 2.48 - 33
" 39 33	" 29 24.75	" 49 - 35
" 40 34	" 30 26	" 50 - 36
41 34.25	" 31 26^{75}	" 51 36.5
42 34.5	" 32 27.10	52 37
44 35.25	" 34 27.90	54 37.5
46 35.5	" 36 28.30	56 38 -
50 36 -	" 40 28.50	3 - 38^{75}
-W. 29.5 (6.5	-W 22^{25} (7.75)	-W. 32^{25} (6.50)

June 25. 91° Reg. Black Mast	Pc. White Mast. 91°
0. 15	0- 17.5
+W. 3.8 - 34	+W 3.29 35
" 9 - 42	" 30 39.5
" 10 - 44^{25}	" 31 41.25
" 11 - 46	" 32 42.25
12 - 46.5	" 33 43 -
13 47	" 34 43^{25}
15 48^{25}	" 36 44
20 - 50	41 45.25
-W 44^{25} (5^{75})	-W. 39^{25} (6)

June 25. 91°	J. 27.) 74°	J. 27. 73°
# 36 0 - 8	# 37. 0-23.5	# 38 0 - 22.5
+W 4.6 22 (2×3)	W. 9-0 35.5 (2×3)	+W 9.19 35.10 (2×3)
" 7 28^{75}	" 1 36.5	" 20 36.25
8 31	" 2 37	" 22 37.5
9. 32.25	" 3 37.25	" 23 38
10 33	" 4 37.5	" 24 38.25
12 34	" 6 38	" 26 38.70
14 35	" 8 38.2	" 28 ~~39.5~~
18 36.5	" 12 39	" 31 39.5
- W 30.75 (5.75)	-W. 32½ (6.5)	-W 33.5 (6.)

June 27. 73°	July 2 # 30. 81°	28^{584}
Reg Black 0-25.5	0 - 19	
+W. 9 48 36.5	11.42. 32	
49 - 39.	" 43 36	
50 - 39^{75}	44 37	
51 - 40.50	46 39	
52 41	49 41	
54 41.3	54 42.25	
56 41.75	-W. 36.5	
10 - - 42.5	(5.75)	
- W. 36 (6.5)		

July 1st 07.
77°

#42) 0 – 28.5	#43) 0 – 6.5	#44) 0 – 12.5
+ W 9.29 48	W 9.44 34	W. 10–4 – 28
– 30 51.5	45 37.	5 – 30.5
– 32 52.	48 40	7 – 31
– 35 52.5	51 41.5	10 31.5
– 41 53	56 42–5	16 32 –
–W 46 (7)	–W 36.5 (6)	–W. 34 (8)

Dry not (?) Light

#43	0 — 20
+ W.	10–21 – 31.5
	22 – 42
	24 – 44
	28 45.5
	33 46.
– W	41 (5)

79°

July 2: 80° 81°

#46 0 – 12	#45.) 0 23
11. 3 – 27	11– ~~19~~ 36
4 34.5	20 38
7 40.5	22 39
10 43	25 39.25
15 45.5	31 40
–W. 38.5 (7)	–W. 32. (8)

July 1. 1907

45.) Stearic Acid 9½ Acet. Nickel 2.

46.) " " 9½ Acet. Nickel 2 Rouge 3
Reg. Wx 5 L. Carnauba ½

47.) " " 9½ Acet Nickel 2. White Lead 9
L. Carnaub. 2

48.) " " 9½ Acet Nickel 1 Ac. Iron 1 ~~D. Carnau~~ 2
#15 Dodd 5 White lead 4.

49.) Stearic Ac 9½ Acetate copper 1½ acet. magnes. 1 L. Carnaub 3
~~[illegible]~~ Paraffine 1½ Ebonite 3

50.) 20 Reg. Wx 5 hard soap. 2 D. Carnaub. 2 Ebonite
N.G. Soft & sticky.

51.) Stearic Ac 9½ Acet Magnes. 1 Acet. Cupr at. Ammon 1½
L. Carnauba 1 #15 D. 1½
Cracked in moulding.

July 5. 78°

#47.) 0 – 18	#48. 0 – 21
+ W. 9.12 34	+ W. 9 – 39
13 36	– 1 54
14 36.25	2 61
16 36.5	4 67
20 36.75	6 69
24 37	9 71
– W 27.5 (9.5)	– W 64 (7)

July. 11.)

52.) #51 - 6 d. m.d. Carnauba 1. Elemi 1/2

53.) #8A 12 1 2 Carnauba 1 Paraffin

54.) Stear. Ac. 11. Acet. Potasse 3) Carnauba 2 1/2
Paraff. 1 1/2 Elemi 1/2 (add 4 St. Acid

55. St. Ac. 10 Bromide of Soda 3)
July 23-24 Will not dissolve.

56. Aylsworth #535

57. Reamer-chips
a sticks to mould } mould & core hot.
b
III mould hot, ring & core not very hot

56.) I. II. Wx medium hot mould hot, core & ring not very hot
III Wx hot, mould hot, core & ring medium hot, chilled slowly.
IV Mould not so very hot. Wx barely flows
mould and all dipped into water
V. Wx just flows a little more freely. Mould hot chilled quick
VI heated Wx to foaming and let cool down

57VI Shaved #took off thinnest cut. I ran over 5 min with heavy weight reproducer 180 Rev. p.M.

57II 230 Rev. I.) heaviest weight II lightest weight III regular weight
2 min 3 m. 2 m

July 25. 86° - 90°.

Wearing tests July 16. 07 79°
180 Rev. p. Min

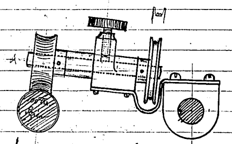
#52 1 min & 2 min.
Reg. 1. 1/2, 2
#53. 1/2 1. 2

July 25
56III Shaved. 240 Rev 3 min reg. Reprod. 90°
56I "
56VI Not shaved. ran 3m. at 230 Rev reg. Rep. no scratch
56V " " 3 " " 240 " heavy weight #2 Steel
After pressing in Water 140° F 225 Atmosph.
56VI 3 min 232 Rev scratch, after cooling in ice water
56V not shaved, ran 3m at 232 Rev. (I before, II after pressing)
57VI Shaved after pressing ran 3m. at 232

July 29th to Aug. 12-07
Experimented with taking records on new hard black wax from Aylsworth
No. 9

Aug 13th To Aug. 17th 07

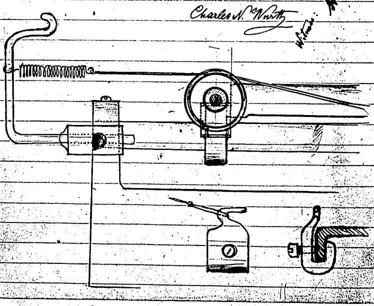
Made 200 thread feed on reg. Home Pionage. with 100 thr. screw. S.O. 1945



August 17th 1907

Charles N. McWirth

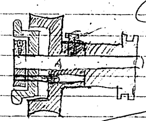
Witness: Herman Voltke



Aug 18th To Sept 17. 07

Experimented with worm-wheels and compound gears for 200 thr. feed.
See sketches on last pages of this book

N. G.



Impossible

S.O. # 1956.

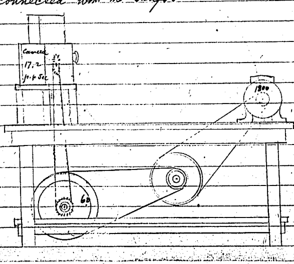
Sept. 17th 07

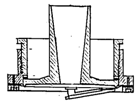
Experimenting with the Kineto-Phon.

To connect the camera and the recording phonograph by a long shaft, sprockets + chains. The projecting machine and the reproducing phonograph to be connected likewise by an identical shaft, sprockets + chains.

With this arrangement absolute synchronism will be obtained.

An Electric motor to drive the shaft. To obtain uniform speed a heavy flywheel is mounted on the shaft. A governor is also connected with the shaft.





Diaphragm-holder for flexible diaphragms*) and appliance for stretching the same to the required tension for producing**) an improved sound-record

*) such as Banjo-head-skin, parchment, tissues etc.

**) and reproducing

Orange N.J. June 25th 1906

Charles N. Wurth

Explained to me
June 25, 1906
Frank L. Dyer

4
11
18
25
1

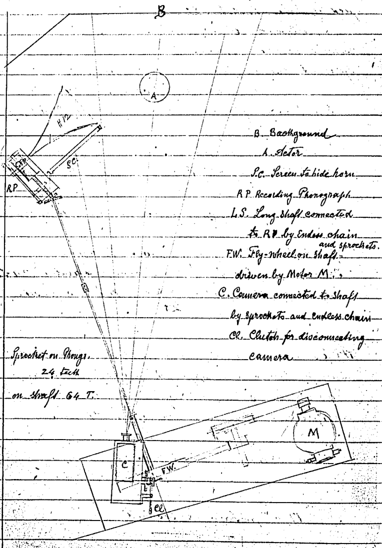
Speed of Motor 1700 to 1800 rev.-p.m.
Flywheel 60 rev. p. m.
Camera makes 21 pictures to 1 turn of crank.
Sprocket-wheel on flywheelshaft for camera 16 teeth.
" " on crankshaft of camera 20 teeth
On turn of flywheel makes $\frac{21 \times 16}{20}$ = 16.8 pict. p. sec.

On Projecting-machine, one turn of crank makes 16 pictures. Sprocket-wheel on flywheelshaft 21 teeth
" " " crankshaft 20 teeth
One turn of flywheel makes $\frac{21 \times 16}{20}$ = 16.8 p. p. sec.

Sprocket-wheel on flywheelshaft to drive Phonograph 64 teeth, on Phonogr-mandril 24 t.
Speed of Phonogr $\frac{60 \times 64}{24}$ = 160 Rev. p. m.

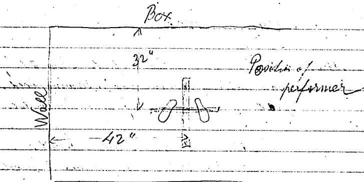
For a camera, which makes 21½ pictures in one turn of the crankshaft, the projecting machine has to be geared up differently, viz:
Sprocket-wheel on flywheelshaft 21 teeth
" " on intermediate 20 "
Gear-wheel on intermediate 86 teeth
instead of 84.

17,2 pictures per second



B. Background
A. Actor
S.C. Screen to hide horn
R.P. Recording Phonograph
L.S. Long shaft connected to R.P. by Endless chain and sprockets.
F.W. Fly-wheel on shaft driven by Motor M.
C. Camera connected to shaft by sprockets and endless chain
Cl. Clutch for disconnecting camera

Sprocket on Phongs. 24 teeth
on shaft 64 T.



Manner of Proceding for taking picture & record

The actor takes his position, the camera is focased and film inserted, blanc cylinder placed on Phonograph and recorder-arm let down, stylus 3/8" from edge of cyl. Then the motor is started and lights turned on. The camera is set in motion by clutch, the actor gives a signal with a mallet or other suitable instrument in such a manner that it can easily be seen on the film afterwards and heard on the Phonogr. After the signal the actor pauses 2 or 3 seconds before starting the performance. The camera is stopped by throwing out the clutch 2 or 3 seconds after the actor has finished.

In reproducing the film is set in the projecting mach. as closely as possible to the signal and the Phonograph also to the starting point of the signal by the ear. The arm being left down and the motor is then started.

May 1908

First trial. Picture-record # 1. Film #1.
Pirman nailing packing-box & sawing wood.
speed on flywheel 60 Rev. p. m. Phonogr. 160.
film

Film # 2. Same subject.
to be used with P. Rec. # 1. (Pirman Box-nailing)

P. Rec. # 3 – Film # 3. June 12 08
Pirman bust picture, singing I was borne in Sweet Carlina
Speed of Flywheel 96., film 27 pict. p. sec. Phonogr. 230

June 16. 08. P. Rec. # 4. Film # 4 (negative)
" Same subject, Speed of Flywheel 60 (59) Phonogr. 160 (157)
Film spoiled by not turning on the El. lights.
Only bright daylight at 1³⁰ P.M.

June 18. P.R. # 5 Experiment, short film. Speed 60. 160.

" " P.R. # 6. Pirmans song, I was born etc.
Length O.K.

June 23d P.R. # 7. Meekers Song Stuttering Song.
Length o.k. Argument between
the two voices.
Trouble about pistols, caused
by running of the motor

P. R. # 8.

July 11. 08 Alb. Benzler with Xylophone

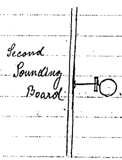
Distance of Xyl. fr. horn: treble ca 18" basse ca 40
centre of horn ca. 6" above Xyl.
horn used for # 5. 6. 7. & 8 = 12½" papier-maché with
tin extension to whole length of 30"

Received pos. print PR. # 8 July 16th. 132 ft.

Absolutely perfect display of this film & record
witnessed by Mr. Edison and Mr. Dyer July 19th. 08.
Reproduced
With same arrangement of shaft, projecting machine and reproducing
Phonograph as for taking camera, recording Phonogr. etc.

August 21. 1908.

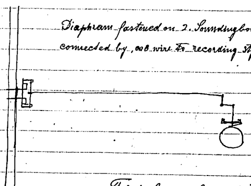
Experiments with taking Piano-records by means of a stretched wire of .008 diam.



Recording stylus connected directly to 2. Sounding board through a stiff brass-wire.

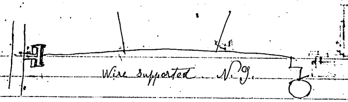
N.G. Very faint.

Diaphram fastened on 2. Soundingboard and connected by .008 wire to recording stylus



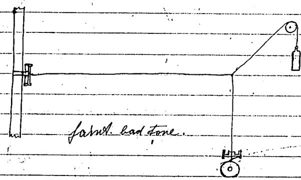
Fairly loud but bad wiry tone

N.G.



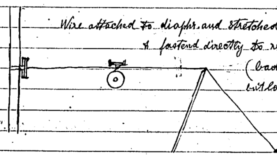
Wire supported N.G.

Recording Phonograph with sliding arbor

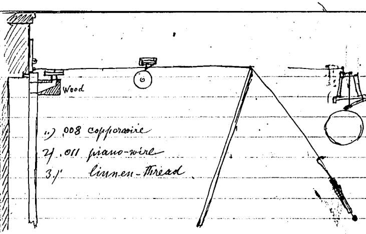


faint. bad tone.

Wire attached to diaphr. and stretched over a support & fastend directly to recording stylus (bad tone.) but louder

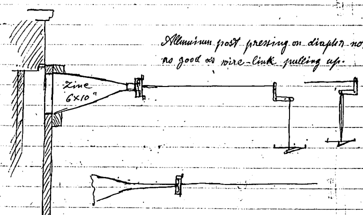


Silk thread instead of wire: very faint.



1.) .008 copperwire
2.) .011 piano-wire
3.) linnen-thread

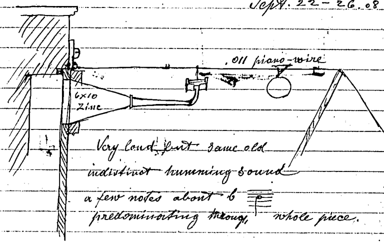
Alluminum post pressing on diaphr not as good as wire-link pulling up.



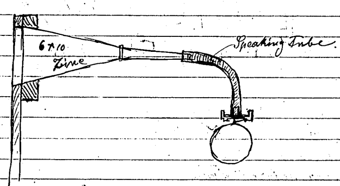
Long-neck funnel is better than short-neck

Record louder but ~~indistinct.~~

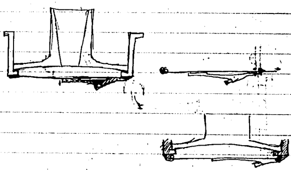
Sept. 22 - 26. 08

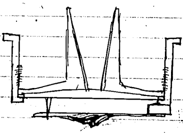


Very loud, but same old indistinct humming sound a few notes about b predominating throug, whole piece.



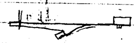
Comes out much louder than played but blasts too much





Octb. 7th

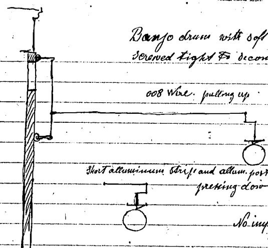
H. Wolke
C. Wurth



Quite loud
Clear natural tone

Banjo drum with soft rubber cushion screwed tight to second sounding board

Octob. 8. 08



No improvement.

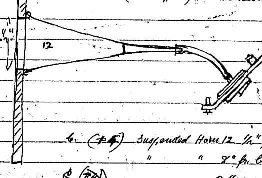
Wire N.G.

Oct. 12

Exp. with 320 Thr.

Fastened Horn #12 to 2d Sounding-board with rubber-cushion, used old Gossam-cl. diaphr. 9010 Styl. Speaking-tube-connection to diaphr.

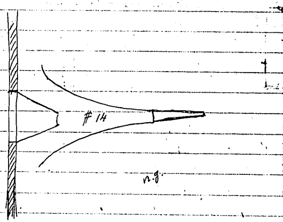
a (record # 4) loud but blasting.

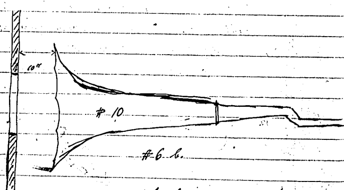


b. (#4) Suspended Horn 12 ½" from S.board
" " 8" fr. board

c (#4) O.K.

Oct. 13. 08.





not as loud as #4 a but clear of blast.
#4 a 2 best tone

November 1908.

Experimenting with 8 min (7 min) 200 thr. records in connection with Pierman Air-pressure Speaker

First spring-motor made by J. Ott runs (1) J. Ott air-pump 60 rev. p. m. without being connected with Speaker.
It takes 1/16 HP (.0087). To work (1) J. O. air pump 150 rev. p. m. which is just right to produce a fairly loud reproduction with P. Speaker.
First J. O. Spring motor has only 1/6 to 1/8 of the power necessary for P. Speaker.

Piermans air-pump (4 cyl. 1" diam. - 1" stroke) requires a 1/32 HP - 110 V. dir. curr. motor .9 Amp. to run the required 200 rev. p. m.
1/16 HP motor with .9 amp. 110 V. = 68 V. - .33 amp.
= 23 watts = 1/32 HP.

or:

2 cells of Chl. Accumul. in serie with
M Phonogr. motor, driving pully .930" driven 1.720"
(at centre of round belt) .130).
4.33 Amp. x 3.8 V. = 16.45 Watts = 1/45 (.022) HP

(measured by Holland)
Nov. 20. 08. removed governor belt.

December 22^d 08

Motor of Business-Phonograph on 8" 200Ths Phon.
Same motor on Piermans pump; universal resistance
One 16 c.p. lamp between the governor-contact-sps.
The pump-motor alone takes .430 Amp. 113 V = 48.59 W.
both motors together .700 Amp. 113 V. = 79.1 Watts
Phonogr.-motor .270 Amp. 113 V = 30,51 Watts.

January 5. 1909

John Otts' air compressor; 4 cylinders 1.210 Diam
1" stroke, with cork-valves;
Pump-motor alone absorbs .473 Amp. 117 V. = 55 W.
with pump at 180 Rev. .501 " 117 V. = 58.7 "

Phonograph-motor alone .280 Amp. 117 V. 32 W.
with Phonogr. the same
The both together ca. 90 W.

The Phonogr. motor runs faster alone than when connected with the Phonogr.; the difference of the speed indicates the amount of power required for the Phonogr.

John Otts & Piermanns pumps must take the same amount of current in order to give the same pressure.

January 6. 1909.

The M Phonograph-motor with one cell of chloride accumulator takes 2,6 Amp. 1.93 V. = 4 Watts. to run the 8" 2 3/16" Phonograph at 160 Rev. p.M.

January 18. 09

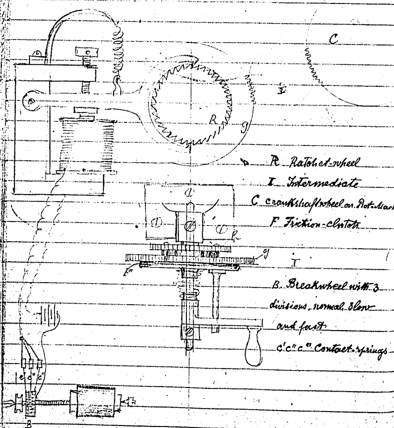
Replaced air-boddle by a cylinder (concert mould) covered on one side with three thicknesses of .023 sheet rubber; no difference.

February to April 10. 09

Experimented with different forms motors, air-pressure, tubes etc. for Piermans speaker

April 12. 1909.

Experiment work for Mr Dyer #2066
Synchronizing arrangement for Phonograph and Picture-machine.

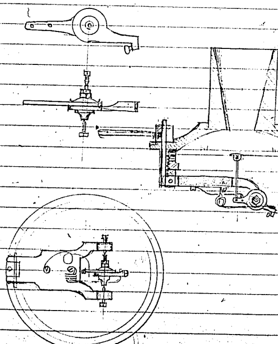


R Ratchet-wheel
I Intermediate
C crankshaftwheel on Pict-Mach
F Friction-clutch

B. Breakwheel with 3 divisions, normal, slow and fast
c'c''c''' Contact-springs

May 13. 09 Received one positive print of PR #7 (Mecker) for S.O. #2066.

June 14. 09. Make Reproducer with compound Rep-ball-lever, held together by friction



July 16. 09.

Make Reproducer with Rep. ball-lever swinging around centre of Diaphragm instead of hinge on edge.

Weights of Diaphragms in milligrammes, reg. Diam

Mica 4 thick's of ,002 each		27,8
Cork	,050	208
White Celluloid	,0065	201
Reg. copper	,0025	598
Hard rubber	,0065	185
Alluminum	,005	299

November 22nd to Dec. 17. 1909

Make preessed duplicates of wax & celluloid for leg. dept.

Dec 1. blancs of hard 4 min master-wax
length of mould 4.125.
Diam. 2.181 – 2197 Taper .16
length of blanc 4.260
diam. 2.180. – 2.196.
temp in core 113°; in tank 124°. 25 min.
small end not pressed out full, large end nearly full.

Dec 2. Mould Expanded to 2.190 – 2198
blanc 4 253, 2 192 – 199
temp. in tank 135
" core 125 to 130
time of exposure 35 min.
Tim for cooling in open air at 5°C. 1/2 hour.
blanc was slightly too large

#3. 4.252, 2191 – 2198. 124° in core 130 in tank
Exposed 30 min. O.K.

Dec. 20th 1909 to Jan 1910

Made scales for weighing Speaker-Weights.

Adjusted Jewellers Scale and made a set of extra weights: 2 – 1/8 oz 2 – 1/4, 2 – 1/2, 1 – 1 oz, 2 – 2 oz.

Made one auxiliary scale for ~~making~~ marking Division on dials.

January 1910 to February 8.

Made two scales for weighing reproducer-weights, One for regular inclined arm, one for level arm. Mounted on A sleeve to go on ~~[illegible]~~ arbor, a spiral spring to lift up a lever, which lifts the weight. The pin, which bears and works the spiral spring also bears the index-hand, which shows the weight on a dial.

1910.

February to March 22. With interruptions.
for blower-Experim.
Made four scales for weighing Reproducer-weights
as suggested by Mr. Edison. Dec. 20. 09.

March 23. 1910

Finished arrangement for gaugeing different kinds of blowers.

1910

March 25 to April 2.

Made improvements on apparatuses for removing wax-chips from master-records under the microskope; for Mould-Department.

April 2 to 30.

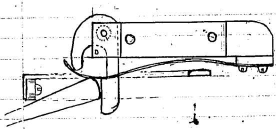
Worked on blower-tests; record-cleaners Etc. Etc. Etc.

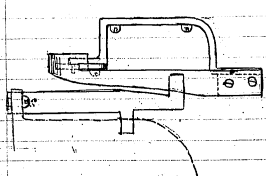
May 2. to 7th 1910.

Automatic Switch for Business-Phonograph.

(Malade 9-14.)

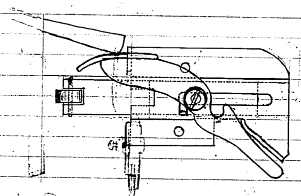
My scheme : finished May 16.

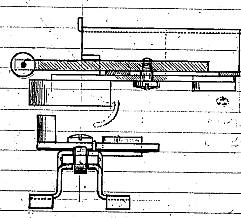




May 17. to June 2d

Improved M. Scheffels model of automatic switch for Business Phonograph and made a working model.



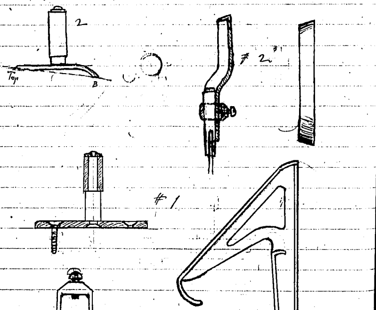


June 6th 1910

Automatic Stop for Busines Phonograph

#1 flat. #2 off-set

To be clamped onto Switch-levor.



June 7th to July 7th 1910
Laid up with Gout.

July 19. 1910

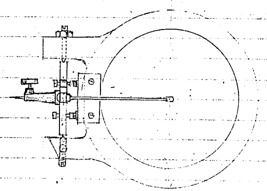
Started on improvements Experiments on Moving-picture-machines
By order of Mr. Sheffel.

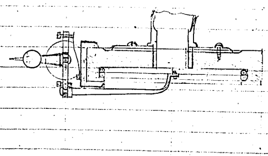
July 13. to laid up with gout.

July 20. Put off experiment till apparatuses are finished

July 20. 1910.

Make Disc-reproducer for Side-ways-cut record.
By order of M. A.

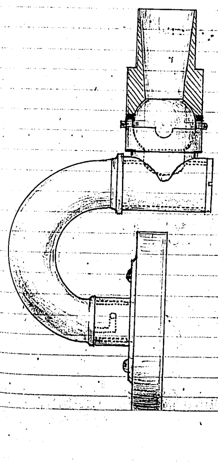




1910.

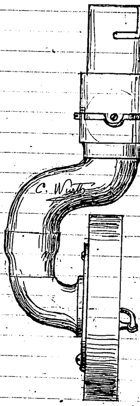
August - September -

Made connections for using Victor-discs on new Edison Disc-Machine

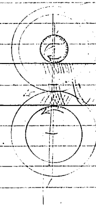


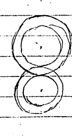
1910

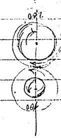
Sept. 13.

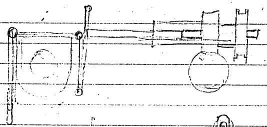


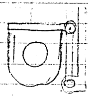
[THIS BOOK WAS USED IN BOTH DIRECTIONS.
THE FOLLOWING PAGES WERE FILMED FROM
THE BACK END FORWARD.]

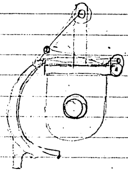


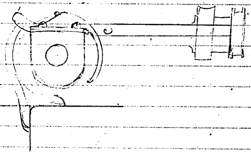


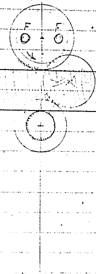




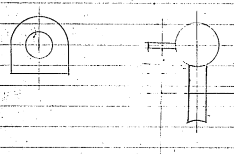


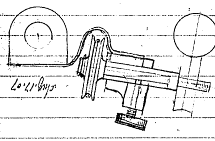




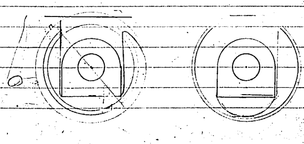


July 29. 07
G.W.



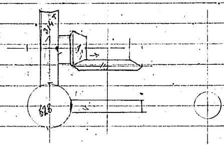


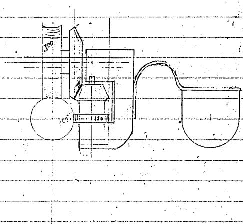
Aug. 17.07



1945 Aug. 24 07

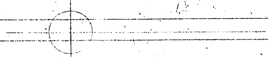
C. W.



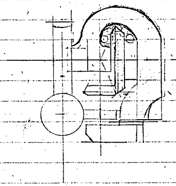


956
483

300/314/95.54
2826
1740
1570
1700
1570
1300



Aug. 27th 07
C.W.



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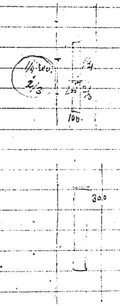
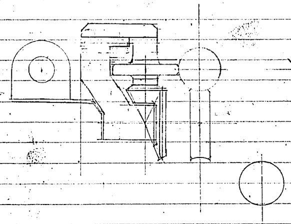
152





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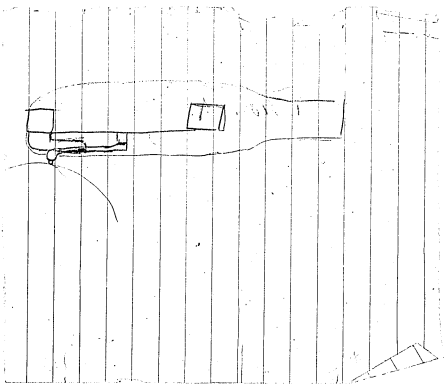
H. Wurth

Come & see me

Edm

[ITEM FOUND IN BOOK]



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Thos. A

[ITEM FOUND IN BOOK]

M. Victor Ettienne Prétot, mechanic, living in Paris, 10 Rue des Immeubles industriels, has appeared before M. Adrien Constant, ~~Mayor~~ and his colleagues, the undersigned notaries in Paris

(He) (Prétot) has by these presents designated as his attorney M. Charles Wurth, mechanic, living in Camden, near Philadelphia, 10 York Street (United States of North America).

To whom (Wurth) he gives the power for him and in his name to:

Develope in the United States of America and particularly in Philadelphia, according to the conditions which the attorney will take notice; the patent which was awarded to him in France on the twenty fifth day of February, one thousand eight hundred and eighty one under the number 140655 for the invention of a machine to clean knives, as well as other patents which the principal might obtain

To take out all patents of improvement et certificates of addition, to change them or withdraw them if that should take place.

In consequence, to present to any competent authority, all demands, petitions et and request, to present to all officers and offices credentials and commissions which may be necessary, to sign and approve all descriptive articles, to require all verbal warrants, to contract all engagements, to change or withdraw all taxes,

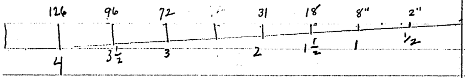
[ITEM FOUND IN BOOK]

To sell and to cede to persons according to the price, the charges, conditions which the attorney will judge convenient, - the aforesaid patents, patents of improvement, certificates of addition: be they ~~definit~~ permanent or for a determined period of time - to receive the price for the said sales and cessions as well as all other sums which might arise from the exploitation of the said patents.

In case of the failure of any debtor, to take part in all deliberative meetings of creditors, to name all representatives or agents temporary or permanent, to sign all agreements, contracts or otherwise, and if any one opposes to produce all titles and deeds, to affirm the sincerity of the credit of the principal, to contest or admit that of other creditors, to make all remittals and to receive all dividends.

In case of whatever difficulties there may ~~be,~~ arise and in default of payments

[ITEM FOUND IN BOOK]

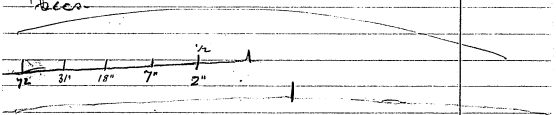


(4 ft up - mirror) 1/2 mile periscope up 4 ft. just see top -
periscope can see ship silhoutte, 2 ft -

1/2 1 $1\frac{1}{2}$

1 mile 4 ft mirror, see periscope, ~~3ft~~ 4 ft up see 8" of ~~ft~~
periscope sees 20.4 of ship

4 ft mirror $1\frac{1}{2}$ mile - see $1\frac{1}{2}$ ft of periscope - Sub
sees -



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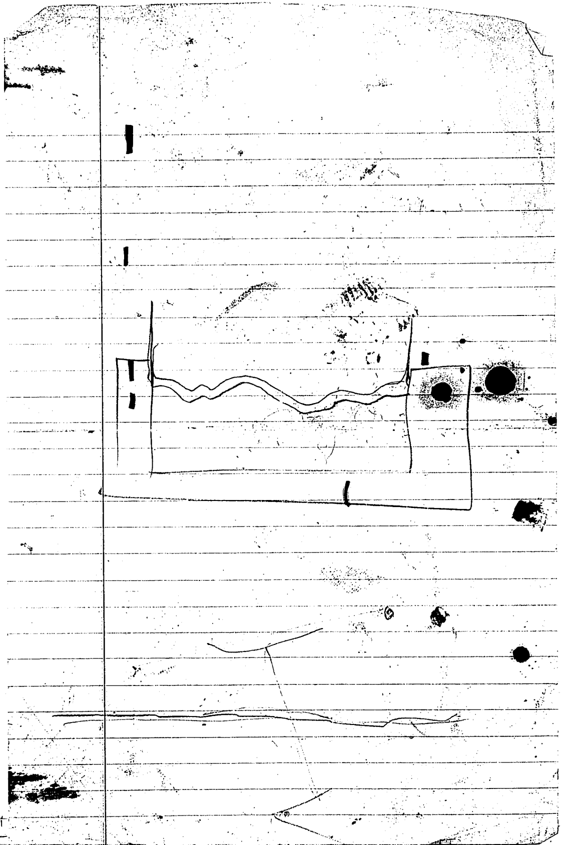


[ITEM FOUND IN BOOK]

CYLINDER RECORD MFG. BUSINESS

OFFICE OF DIVISION MANAGER

March 22, 1920.

Mr. A. Wurth, Supt.
Cylinder Record Mfg. Division

Effective Monday, March 22nd, and until further notice the following temporary rate will apply to the Reaming Operation:

This rate will be subject to withdrawal or revision at any time when, in the opinion of the management, it has not accomplished the desired results.

<u>Starting Rate</u>: Operators will be engaged at 45¢ per hour and rated at that figure until such time as they qualify for piece work. This period should not be over one week.

<u>Qualifying for Piece Work</u>: When one operator has reached an output of 80 boxes in 8 hours and a net o.k. production of not less than 96%.

<u>Base Rate</u>: $.13 per 100 records reamed.

<u>Cooperative or Differential Rate</u>: When the net o. k. production for the entire reaming force reaches 97% the rate is automatically adjusted to $.135 per 100 units; 98% $.145 per 100 units and 99% $.155 per 100 units. The individual earning will, of course, be based upon the individual production.

<u>Advantages</u>: The earnings of the entire force will not be affected by one of two slow operators or absentees - quality only will increase or decrease the rate.

One or two operators producing 70 or 80 percent o.k. work will reduce the earnings per 100 units of the entire crew.

Foreman participating on the same percentage basis, figured over a period of a week, will exercise closer supervision and eliminate poor operators.

<u>Limitations and Penalties</u>: The production per operator should be limited to 110 boxes per day. This to be accomplished by number of operators rather than by limiting the number of boxes delivered to each operator.

[ITEM FOUND IN BOOK]

Method of Computing: In arriving at the percentage figure the over and under-gauge and eccentric records at gauging will be used as the base. Operators will not be penalized by discards over which they have no control.

Earnings: The attached example will serve to show how this will effect an operator's earnings.

The foreman's earnings increasing at the same percentage ratio based on the average for the week will be as follows: Base $29.00. 97% week $30.15. 98%, $32.50 - 99%, $35.00.

To encourage the highest possible quality this rate should be explained to each operator and it would no doubt be advisable to post in the reaming room the prevailing rate for the week and day previous.

W. E. Sanborn
WES.
Division Manager.

Alexander N. Pierman Notebook
[unnumbered]

JANUARY, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

SUNDAY	A. W. Pierman
1 MONDAY	The following are experiments with Vacume Reproducer
2 TUESDAY	tried [illegible] rubber valve on Vacume reproducer tone good, very weak
3 WEDNESDAY	tried doubble thickness Celuloid for Valve on Vacume reproducer works better than single.
4 THURSDAY	
5 FRIDAY	tried holes in Valve instead of slots
6 SATURDAY	

JANUARY, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

7 SUNDAY	transmitter
8 MONDAY	tried pading Valve with paper to stop squeal, N. G.
9 TUESDAY	received carbon Dia from Wong
10 F **10** WEDNESDAY	
11 THURSDAY	tried flat spring seems better
12 FRIDAY	Gave details of Valve to Mr Lewis the draftsman
13 SATURDAY	

JANUARY, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

14 SUNDAY	
15 MONDAY	
16 TUESDAY	Made milling fixture for cutting rings groove in valve
17 WEDNESDAY	made Reducing valve for air pipe
18 THURSDAY	
19 FRIDAY	
20 SATURDAY	

JANUARY, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

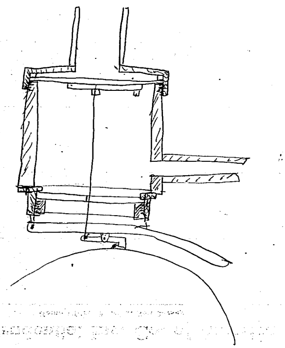
21 SUNDAY	
22 MONDAY	mad seperate reed Valve.  also tried fastening valve on both ends
23 TUESDAY	found cause of squeal. cut side slots and stoped it 
24 WEDNESDAY	
25 THURSDAY	made Valve-seat with slots forming a square 
26 FRIDAY	
27 SATURDAY	

FEBRUARY, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

11 SUNDAY	
12 MONDAY	
13 TUESDAY	
14 WEDNESDAY	Changed to large chamber below valve in Vacume reproducer, same principle as first model made. AJP
15 THURSDAY	
16 FRIDAY	
17 SATURDAY	



FEBRUARY, 1906

18 SUNDAY	
19 MONDAY	Mr Lewis made drawing of the large cavity model Vacuum reproducer for Patent Office as above ↑ AJK
20 TUESDAY	
21 WEDNESDAY	Mr Edison Mr Gilmore Mr Weber Mr Bergman Mr ?— called to hear Vacuum Reproducer all pronounced it a success. AJK
22 THURSDAY	
23 FRIDAY	
24 SATURDAY	Received drawing of air tank from Lewis, made sketches of 3-cyl" pump and turned them over to Lewis.

FEBRUARY, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

25 SUNDAY	
26 MONDAY	Went to N. Y. "Record Dept" to examin reduction valve
27 TUESDAY	
28 WEDNESDAY	
1 THURSDAY	**MARCH, 1906**
2 FRIDAY	
3 SATURDAY	

MARCH, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

4 SUNDAY	
5 MONDAY	Finished reducing Valve for use with Vacuum reproducer.
6 TUESDAY	
7 WEDNESDAY	
8 THURSDAY	
9 FRIDAY	
10 SATURDAY	

APRIL, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

8 SUNDAY	
9 MONDAY	
10 TUESDAY	
11 WEDNESDAY	
12 THURSDAY	
13 FRIDAY	Finished small vacuum pump crank motor
14 SATURDAY	

APRIL, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

22 SUNDAY	
23 MONDAY	
24 TUESDAY	
25 WEDNESDAY	Finished upright vacume pump walking beam motor
26 THURSDAY	
27 FRIDAY	
28 SATURDAY	

29 SUNDAY	
30 MONDAY	
1 TUESDAY	**MAY, 1906**
2 WEDNESDAY	
3 THURSDAY	
4 FRIDAY	Finished upright Pump intended to be held in position by leg of chair
5 SATURDAY	

MAY, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

6 SUNDAY	Coney Island, had L. G. T.
7 MONDAY	
8 TUESDAY	Tried Centrifugal pump experiment.
9 WEDNESDAY	
10 THURSDAY	
11 FRIDAY	
12 SATURDAY	

MAY, 1906

The Prudential Ins. Co. of America

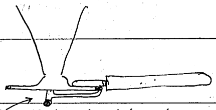
Home Office, Newark, New Jersey

20 SUNDAY	
21 MONDAY	
22 TUESDAY	
23 WEDNESDAY	
24 THURSDAY	
25 FRIDAY	Made rubber pad hearing tube for numerical machine
26 SATURDAY	

JUNE, 1906

The Prudential Ins. Co. of America

3 SUNDAY



4 MONDAY

5 TUESDAY

Finished model of surface testing reproducer for use on shaving machines. showed same to Mr Dyer and left model to ~~have~~ drawing made for Patent

A N Pierman

6 WEDNESDAY

7 THURSDAY

8 FRIDAY

9 SATURDAY

JUNE, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

10 SUNDAY	Rockaway Beach
11 MONDAY	
12 TUESDAY	
13 WEDNESDAY	
14 THURSDAY	
15 FRIDAY	Finished boat pump (4 cyl)
16 SATURDAY	

JUNE, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

24 SUNDAY	
25 MONDAY	
26 TUESDAY	
27 WEDNESDAY	Finished foot Bellows- works O.K. AJP
28 THURSDAY	
29 FRIDAY	
30 SATURDAY	

JULY, 1906

The Prudential Ins. Co. of America

8 SUNDAY	
9 MONDAY	
10 TUESDAY	
11 WEDNESDAY	
12 THURSDAY	
13 FRIDAY	Received castings for memorandum tape attachment for Business Phonograph
14 SATURDAY	

JULY, 1906

The Prudential Ins. Co. of America

Home Office, Newark, New Jersey

22 SUNDAY	
23 MONDAY	Made hearing tube closed with extension tube running down to within 1/32 of inch of Diaphragm to the machine [illegible] [illegible] entering [illegible] tube [illegible] [illegible] [illegible]
24 TUESDAY	
25 WEDNESDAY	
26 THURSDAY	
27 FRIDAY	
28 SATURDAY	

Notebooks by Experimenters Other Than Edison
Group 8: Miscellaneous Experiments

The thirty-four notebooks in this group primarily cover the period July 1900-July 1911, but several contain entries from as late as 1914. They were used by Edison employees, including Arthur H. Glaister, Walter E. Holland, and Ludwig F. Ott, and contain only occasional notations or drawings by Edison. The entries pertain to a variety of subjects. Included is a book by Cloyd M. Chapman providing details of his work on a dry placer process for gold ore concentration and several books by other authors on radioactivity. Also included are notes on tests of primary batteries; experimental notes pertaining to lamps, mining, metals, the "Edison effect," electroplating, oil filtering, and ore separation; and a few entries regarding photography and motion pictures. In addition to the entries by Chapman, Glaister, Holland, and Ott, there are notes by Alvin D. Caskey, George Hetherington, John F. Ott, and others. Two of the books, N-Undated.38 and N-06-11-21, contain rough drawings by Edison that appear to be unrelated to the contents of the books themselves; N-03-12-18 contains a loose note from Edison to Robert Rafn.

Entries from ten notebooks have been selected. Partially selected books are indicated by bracketed comments and bracketed numbers noting the approximate percent of pages selected.

<u>N-Number</u>	<u>Inscription on Front Cover or Flyleaf</u>
	[additional information supplied by the editors appears in brackets]

Selected Books

Undated.38	"Edison Lab Orange NJ Notes <u>HBM.</u>" [notes on plating cylinders, ca. 1899-1900; only the (unsigned) Edison drawings have been selected]
00-07-13	"Experiment upon Lamp for Cheap Hand Keneto—Laboratory Charge No. 1049 Louis Ott" [contains only 4 pages of notes]
03-00-00.1	"Placer Process General Notes" [technical notes and rough accounts by Cloyd M. Chapman]
03-12-18	"Rob. Rafn Dec 18 1903" [notes entitled "Substances tried for Radioactivity"; only a loose note from Edison to Rafn has been selected]

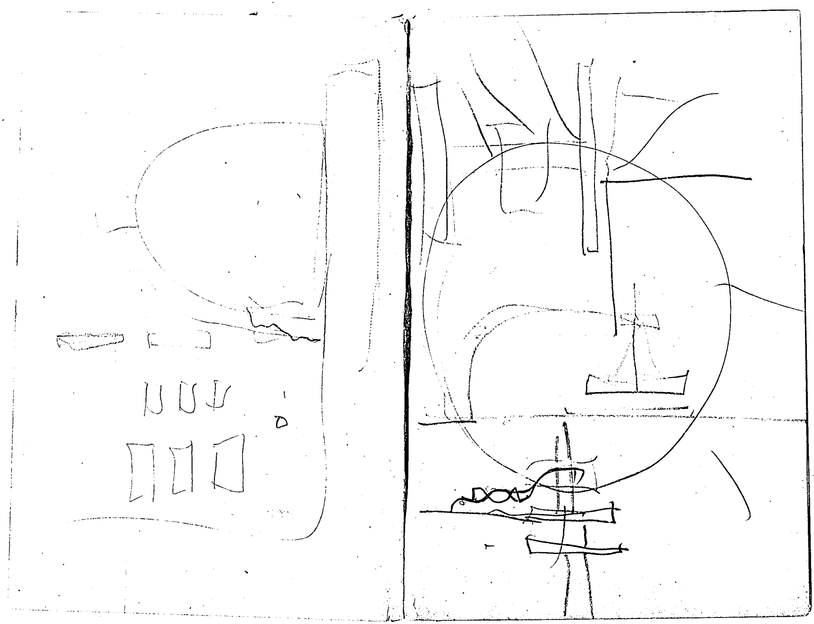
05-02-18	"Miscellaneous Readings & Tests Vol. I 2-18-05 -- 8-18-06" [by Walter E. Holland; only his incandescent lamp notes have been selected] [10%]
06-11-21	--- [ore separation experiments; only the (unsigned) Edison drawings have been selected]
05-00-00.5	"Experiments upon Uranium Salts & Radio Activity" [by Arthur Glaister; only his "Experiments in Stereoscopic Photography & lantern projection" have been selected] [10%]
07-06-17	"Metallic Films 6/17/07" [by Walter E. Holland]
07-06-18	"Experiments on the Scintil[l]ations of the different metals under the electric spark" [by Arthur Glaister]
07-08-12	"'<u>Edison Effect</u>.' 8/12/07" [by Walter E. Holland]

Books Not Selected

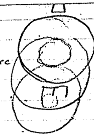
01-00-00.1	--- [notes entitled "Calculations on the <u>maximum stresses</u> in an automobile."]
01-00-00.2	--- [continued calculations on stresses of automobile parts]
01-02-19	"Separator"; "2/19/1901 to" [notes on ore separation]
01-06-06	"Primary Battery Tests" [multiple authors]
02-02-17	"X Ray No. 1 Chemicals 2/17/02" [by George Hetherington]
02-04-02	"X-Ray Chemicals No. 2" [by George Hetherington]
02-05-19	"X-Ray Chemicals No. 3" [by George Hetherington]
02-08-09.1	"Hetherington's Chemicals. Book No. 1. From 30001 to 32484" [by John F. Ott]
02-08-09.2	"Hetherington's Chemicals. Book No. 2. From 32485 to 34900" [by John F. Ott]

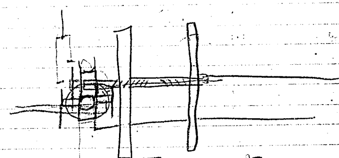
02-08-09.3	"Hetherington's Chemicals. Book No. 3. From 34901 to 37315" [by John F. Ott]
02-08-09.4	"Hetherington's Chemicals. Book No. 4. From 37316 to 37963" [by John F. Ott]
03-05-20	--- [notes on ore processing]
03-12-11	"Experiments upon Radium by T. A. Edison" "Witness Ludwig F. Ott Dec. 11, 1903" [by Ott, several pages only, in expectation of experiments by Edison]
05-01-24	"Caskey. Alloy's Metallic Drums. And Pencils Jan 24–05"
05-10-04	[notes on ore samples tested for radioactivity, apparently by Alvin Caskey]
06-11-30	"Record of Switch Board Rdgs Started Dec. 1st" [switch board readings probably having to do with storage battery tests]
07-00-00	--- [notes entitled "Experiments upon Phosphorescent Salts. No. 1973."]
07-02-06	"Cold Test on Edison Primary Cells. Latchford, Ontario. 2/6/07" [by Walter E. Holland]
07-06-20	"Walter E. Holland June 20, 1907" [graphs of data from N-07-06-17 and N-07-08-12]
07-09-27	--- [notes entitled "Measurements about Radioactivity Sept. 27. 1907" and illustrating apparatus]
09-01-15	"Experiments on Electric Arc Drilling of stone by means of electric arc. Jan. 15, 1909 Robert Van Benthuysen"; "Experiments also on the C-Fe_2O_4 arc for rectification"
10-06-22	"Notebook of Ludwig F. Ott Containing Experiments and Analysis made in the Laboratory of T. A. Edison From June 22 1910 to July 21, 1911"
Undated.28	--- [one page of notes comparing German silver and copper wire]
Undated.33	--- [notes entitled "Oil Filtering" and notes on brushes for motors or generators]

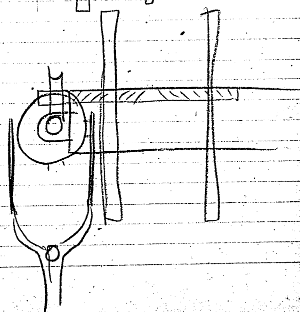
Notebook, N-Undated.38



60) 1500 (25 sec
120
300







Notebook, N-00-07-13

N-00-07-13

XE-172

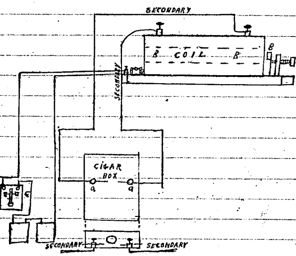
Experiment upon

Lamp for Cheap Hand Kineto-

Laboratory Charge No 1049

Louis Ott

Experiment Started this th day of July 1800 A. D. Started on ending of experiment Crude working model this 13th Day of July 1900 A. D. Finished 1900 A. D.



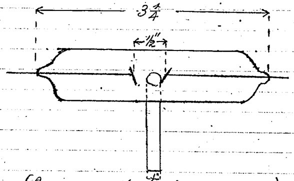
A cigar box with a 1" hole at one end and two binding posts a a was made to connect within with a glass tube or other substance through which current may be passed, box was made dark. The current was led from 2 Type E Chloride Accumulators to the Coil the vibrator of which was short circuited to Morse Telegraph Key c thence back to Battery two secondaries led to binding posts a a.

In Open Air

Platinum wire
Copper "
Aluminum "
Magnesia "
Zinc Sticks
Chalk

This group only gave ~~a glow~~ small spark about 1/8" long

In Vacuum



(In using salts no discs were used)

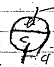
Copper and Calcium Cyanide (No Good)
" " Nickel " (Fair)
" " Chromium " (No Good)
" " Molybdenum " (No Good)
" " Lead " (Fair)
" " Silver " (No Good)
Silver " Strontium " (No Good)
Calcium Cyanide Copper Sulphide (No Good)

Uranium and Cadmium Benzoates (Good)

Next in the same kind of a glass tube were inserted 1/2 inch apart discs

□ 3/8 square PLATINUM PLATINUM
with platinum leads
1. copper discs
2. Aluminum discs Heats up the least
3. Platinum discs Smoke Glass

Made Platino Cyanide of Barium which was fair
Tungstate of Calcium gave best Results also made such a lamp 4 — 4 platinum



poles b tin foil C = Calcium Tungstate fastened to the glass by means of heat Quinine Sulphate Not Good
Barium Sulphide looses properties on exposure to light

Made Copper Cyanide which was not very good
Zirconium Oxide

Notebook, N-03-00-00.1

1000 tons ^mud per day of 20 hrs
50 " " hr
Machine will do 2 tons per hr
2.5 Machines required
Screens will do 1 ton per hr
50 banks of screens needed
30 screens high + 4 coarse
1500 screens 1st size
1200 " 2nd "
900 " 3rd "
600 " 4th "
300 " 5th "
200 Coarse 1st "
160 " " 2nd "
120 " " 3rd "
80 " " 4th "
40 " " 5th "
5200 Screens in 5 groups

1st Bank 50 screens wide 34 high
2nd " 40 " " 34 "
3rd " 30 " " 34 "
4th " 20 " " 34 "
5th " 10 " " 34 "

$20 per screen for construction

~~$2000 for 50 tanks at 64 screens~~

$20 per 1000 for timber work
+ cost of lumber.

Steam Shovel $12,000

Grisley at Shovel 6,000

Tressle + grisleys $5,000

2 trains & 8 cars.
cars 6 or 700 each

2 locomotives – $6,000 each

$10000 per mile. 60 lb rail
Broad guage

~~12,000~~ $6,000 for Dryer

Storage bin $1,000

Belt conveyors, $20 per foot
17 or 18 %

1 Steam shovel handling
3,000 tons or 2000 cu yds
in 10 hrs. Shovel to
work only 1 shift. 10 hrs
Mill to run night and
day.

R. R. Cars (Dumping cars)
Rails & Engines, tressles
&c. Screens at Shovel.
Dryer, if needed, to work
either 10 or 24 hrs. according
as material from shovel is
stored before or after drying.

Blowers $150 each 33% more blowers than needed

$300 for magnetic sep.

At Edison Portland Cement Co's works conveyor from Rock Crusher to Drier is about 275 ft long 24" belt running 500 ft per min took about 4½ HP running light

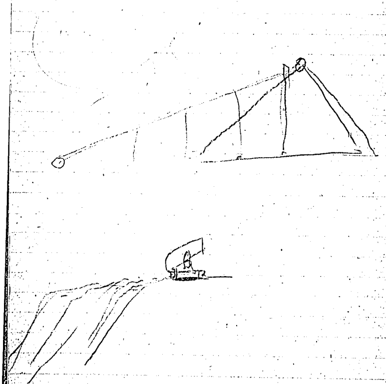
275 ft
4½ HP

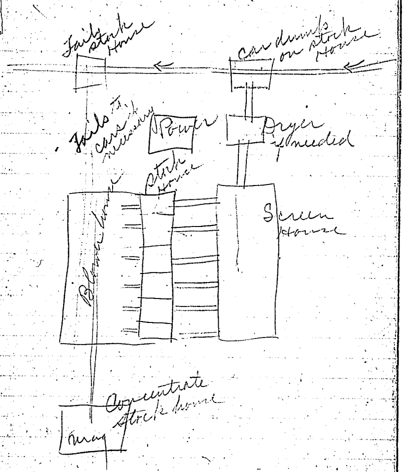
24"
Conveyor
500 ft per min

Screens as per first page delivering into separate ~~stock~~ storage compartment for each size — say 6 sizes 25 Blowers for each 1000 tons, say 2 blowers on largest size, 3 for intermediate sizes and 4 perhaps 5 for fines.

Concentrates to be treated magnetically if it contains much iron or reconcentrated,

Conveyor [illegible] #20



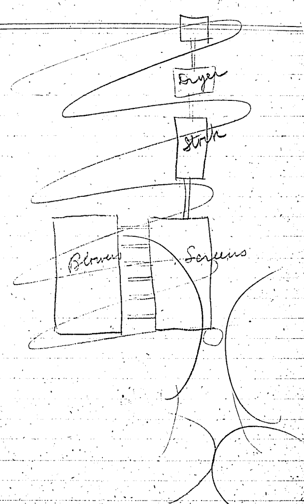

Tails stock House
car dumps on stock House
Tails to cars if necessary
Power
Dryer if needed
Stock House
Blower house
Screen House
Concentrate stock house
mag

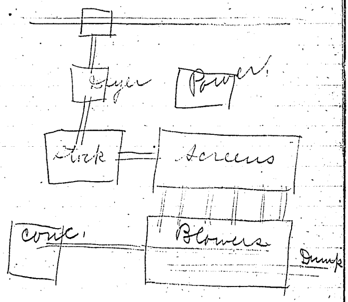
$100 per horsepower for equipment

2½¢ per K.W. hr.

4½ lbs per Hp hr. for running

2½ HP per 100 ft of Conveyor plus gravity




Dryer
Power
Tank
Screens
conc.
Blowers
Dump

Shovel
Rotary Screen (run by power from shovel)
Cars
Track
Tressle
Dumping house
Conveyor to dryer
Dryer
Conveyor to Stock house
Stock House to hold ½ daily capacity.
Conveyor to Screen house
Screen House
5, 200 Screens for each 1000 tons
5 elevators between screen banks
6 Conveyors from screens to bins
6 Conveyors from bins to Blowers
25 Blowers for each 1000 tons
Blower house
Conc. Conveyor under Blowers
Tailings Conveyor " "
Conc. Stock house
Tailings dump.
Power house

Labor Acct

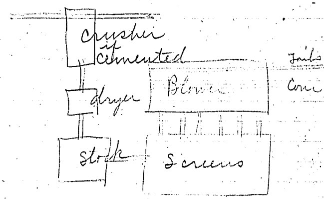
Steam Shovel 7 men
P 12 ... 4 men — 1 Eng, 1 Fire, 1 Crane, 4 Pit men
Train gang
[illegible]

Dryer – 2 men
1 conveyor man
Screens – 2 [illegible]
2 [illegible]
Blowers 2 conveyorman
4 Blower men
Power 2 Tailing belt,
2 Conc,
2 Eng, 1 Elec
2 Firemen, 1 Asst.
Conc 2 men on [illegible]

General 1 oil man
5 labor & foreman

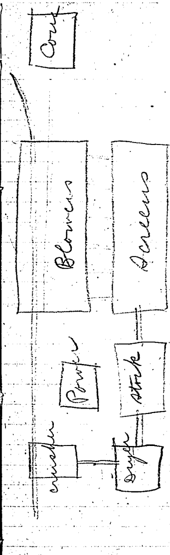
Mechanic Master mech.
Forge 5 Mach. 3 helpers 2 carpenters
Office (Salary)
Manager – Mill Supt, & Asst
clerk & Book keeper & Boy
1 cart & man & team

add 10 – $2 men,



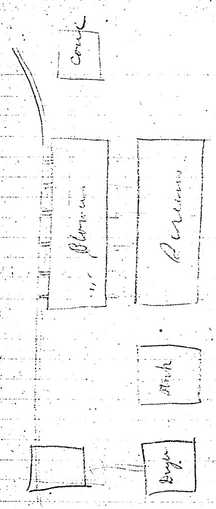
Proposition —

when active (money [illegible])
[illegible] plus sinking fund
[illegible] [illegible]
[illegible] 32%.

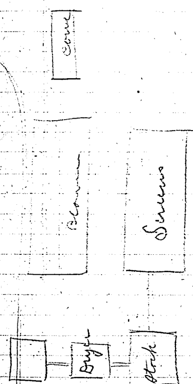


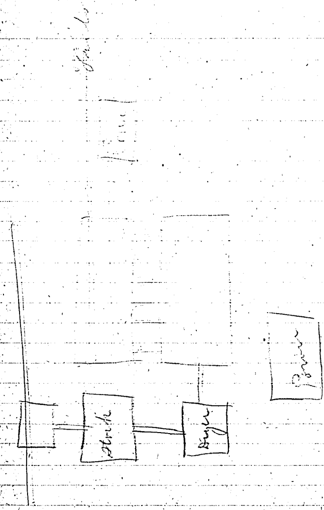
Labor & Expenses

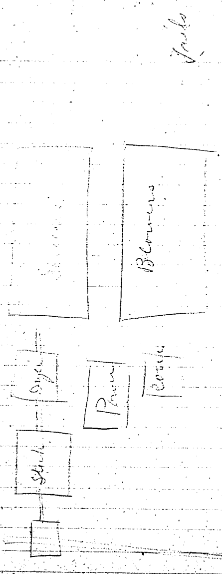
Shovel Gang	Shovel Man	3.00
	Engineer	2.50
	Fireman	2.00
	4 Pit Men	6.00
Oil		2.00
Coal 4 tons		16.00
Train Gang	2 Eng	5.00
	2 Brakemen	4.00
	2 Firemen	5.00
	Coal & Oil	10.00
	2 Dumpers	3.00
Dryer	2 firemen	4.00
	2 Helpers	4.00
Conveyor to Screens 2 men		4.00
Screens 6 men		12.00
Blowers 8 men		16.00
Power	2 engineers	7.00
	2 Firemen	4.00
	Electrician & Asst.	7.50
Conc. May. Sep 4 men		8.00
		123.50

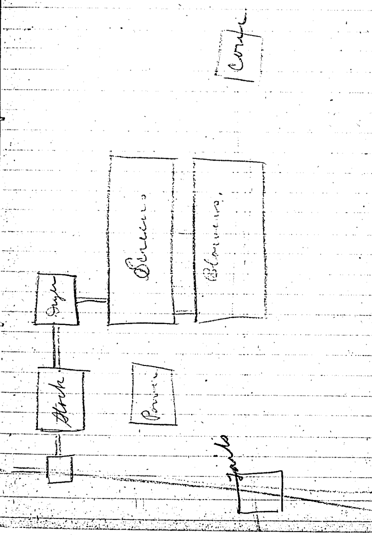


Brought Fwd	123.50
Oil men 2	4.00
5 Laborers & Foremen	10.00
Foreman Mach. Shop	4.00
5 Machinists	15.00
3 helpers	4.50
2 Carpenters	7.00
Master Mechanic	5.00
Man & Team	3.00
Manager	6.00
Mill Supt.	5.50
Book Keeper	3.00
Clerk	2.50
Boy	.75
10 Tipple men	20.00
	213.75
Sinking fund	90.00
	313.75
Coal 8 tons	40.00
Oil	3.00






Tanks
Blowers
Dryer
Stack
Power



Boilers
Blowers

30
30
900
15
4500

225
30
6750

625
25

14 14

312
150
25
750
300
3750

100
20
2000

20
20
400

25
25
125
625
16
3750
625
10000

25
25
625
4
2500
2
5000
2
10000
1000
11,000
5,000
16,000
20,000
45
20
900

1st Storage bin - under car dump.
to hold 750 tons, 500 cu yds
or 13500 cu ft say 25 ft cube
using say 20,000 ft at $45 per M
$900 Say $1000

Last Storage bin - over cars
same size as first say $1000

Conveyor [illegible] height 50. ft.
[illegible] 70.
[illegible] 30.
[illegible] 25.
180 ft

Conveyor [illegible] — say 1100 ft

HP 1100 [illegible]
[illegible] 2 1/2 HP
60 tons [illegible]
min 2000 lbs lifted 180 ft =
360.000 [illegible] = 11 HP.

Conveyors require say 40 HP.

33 blowers at 1 1/2 HP each
or 50 HP

50 Roller at 1/4 HP each
or 12 1/2 HP

Dryer

Conveyor to Dryer

Dryer 50 ft. high 17 1/2 %
elevation of Conveyor —
conveyor 290 ft long at \$16
per foot = \$4,650 say \$5,000

50 × 50 = 2,500
4
10000
4000
15000
30000

10,000
5,000
15000
45
30
1350

2800
28000
15000
28000
15000
88800

89
45
445
356
4005

Dryer

Say $6,000

Conveyor to Screens
Screen house 75 ft high
conveyor 17½° total 430 ft long
at $16 per foot $7,000

Screen house 90 ft high
50' X 50' say $15,000

Screens 64 high 50 banks
$50 per bank $2,500

Shutes & conveyors to Blowers
Say 30 ft high or 170 ft long
six conveyors or 1020 ft at $16 [illegible]
Say $16,000

33 blowers at $150 = $5,000

Blower house 35 ft high 40 X 350
Say $4,000

Tailings conveyor
350 ft + 145 495 ft
$8,000

Cone conveyor 350 + 100 - 450 ft
$7,200

Cone house $2,500

Conveyors. To dryer - 50 ft high
" to Screens - 75 ft high
" to Blowers 180 " "
305 " "
17½% or 1800 ft
Tails Conv 500
Conc Con. 450
2750 ft Conveyors @ $16
= 44000

28
2½
[illegible]

33
3
99

70
20
99

50
310
15500
2000
61)31000000
33~~000~~)516~~000~~
20

250 HP
40
10000

 Figures of Mr. Simpkin

Cost of 2,000 yd plant.

Steam Shovel 65 ton Vulcan	8 000
Grizzly conveying	6 000
Locomotives (2)	8 000
1/2 Mile of Track	5 000
Storage bin 500 tons & cover 21 M @ $30	750
Drier	5000
Drier House 30 x 30 x 50 12 M ~~21 M~~	420
Screen house 30 x 75 x 90 43 M.	1500
Screens	4 000
Separator house 20 x 330 x 15 40 M.	1400
Separators 33 @ 150	5 000
Conveyors	44 000
Tailings bin	650
Power Station 200 HP @ $50	10 000
Motor drives 200 HP @ $16	4 000

Labor Account

Shovel –

1 Engineer	5.00
1 Fireman	3.60
1 Craneman	2.60
6 Laborers in pit @ 1.50	9.00

Trains.

2 Engineers	10.00
2 Firemen	7.20
2 Trainmen	5.20

For Experimental plant at Lab.

10 screens each of 5 sizes
.007, .015, .029, .058, .094.

Screen frame or bank, 10 screens

Separator complete 4 ft wide
of Sheet Iron

Cost of Steam Shovels.

Vulcan Little Giant Traction	1¼ yd.	$5,500
" Little Giant Traction Special	"	6,000
" " " Trucks	"	6,000
" " " "	"	6.260
Bucyrus 35 ton	1½ yd	5,000
45 "	1¾ or 2	6,500
55 "	2 or 2½	7,250
65 "	2½ or 3	8,500
70 "		9,000
75 "	3 or 3½	10,000
85 "	3½ or 4	11,000
95 "	5 yd.	12,000
M. Notchkum Co.	2 yd	4,500
Apex. Little Giant Traction (sp.)	1¼ yd	3,300
" " Trucks	" "	3,800
Marion Model G	2½ "	6,800
" " A 45 ton	1½ "	38 to 4,500
" Improved A		50 to 5,500
Thew #0 single truck	½ yd	3,750
No 1 " "	1 yd	5,200
No 3 " "	1½ "	7,000
No 7 Excavator	1¾ "	6,200
No 6 "	2½ "	8,500
No 5 "	3 or 3½ yd	10,000

Steam Shovels Cont'd.

Dump Cars.

Apex.	3 yd	36"	D.S.D.	Wood 2nd Hand	$45
	3 "	36"	SSD	" new	111
	3 "	"	DSD	" "	121
	4 "	"	SSD	" "	123
	4 "	"	DSD	" "	135
Add $10 to last 4 above for standard guage					
	5 yd	4'-8½"	SSD	wood	148
	5 "	"	DSD	" "	165
	6 "	"	SSD	"	160
	6 "	"	DSD	"	175
Every 5th car with 1 brake full Brakes $9					
"Recking"	24"	3 yd	DSD	oak	20.
	36"	3 yd	DSD		35.
Torbert & Peckham	6 yd	4'-8½"	SSD	Oak steel lined bottom	125
Koppel	36"	2 yd		wood	58
	4'-8½	5 yd		wood roller bearings	182
	"	"	SSD	"	157.50
	"	7yd			225
	"	5 yd	DSD	"	176.

Locomotives

Apex.	36" guage 600 tons haul on level		new	3 200
	standard guage		"	3 300
Mitshkum " "	8 wheel	16x24	(2nd hand)	3 000
" "	8 "	17x24	"	2 500
Recking " "	4 drivers & truck	15½x22		1 650
Forbes & Peckham "		20x24		5 500
" "	6 drivers 40 ton	18x24		4700
" "		20x24		6 000
" "	32 ton	16x24		4000
Porter	17 ton	10x16		4 300
	34 ton	14x20		6400

Box #1 — 1 Parting board frame
5 rear Screens
[illegible] front Screens
2 front & rear Screen frames
60 × [illegible] × 10 = 21.9 cu ft — 340#

B[illegible] — 1 Angle plate for fines
1 [illegible]
4 sides Tailings hopper
4 " Cone "
2 fan casing plates
60 × 43 × 6 = 8.95 — 307#

#3 — 4 Fan Sides
6 Fan Casing plates
1 Top of [illegible]
2 2" Angles [illegible]
2 2½" " Fan " "
4 Short 2" Angles
1 Tachometer pulley $2\frac{15}{16}$ bore
1 Roller bed pulley " "
3 short Angles
5 " "
1 Sampler chute
1 Iron pulley $2\frac{15}{16}$ Bore 4" Diam
1 Short Angle.

5.5 × 53.5 × 101 = 17.2
875#

Box #4 — 8 Fan Blades
2 $2\frac{15}{16}$" Collars
2 $2\frac{15}{16}$" Bearings
2 Fan Flanges
36 × 51 × 12 = 12.72 — 506#

Box # 5
1 Feed hopper front
2 " " sides or ends
1 " " angle
1 " " back
1 Sep side
1 Sep. top
1 Feed Hopper angle
4 pcs angle feet of fan legs
2 Hopper hangings
12 x 27 x 58 393 #
14.9

6 Channels and angle
16 pcs.
6 x 22 x 11.5 = 8.65 [illegible]

7 1 Feed gate Sep.
1 dust screen in frame
5 x 8.5 x 55 65 #
1.3.6

8 1 Tachometer
2 grease cups for fan
9 x 13 x 21 65 #
1.43

9 1 Fan Shaft
6 x 7 x 94 = 2.3 217

10 1 Sep Roller feed with shaft
bearings & grease cups
2 Conc & Tails gates
2 side boards of retarding plate
1 Corner for screen shells
77 x 12 x 10 = 5.735 214 #

11 1 Countershaft for Conc. feed
with collars pulley bearings
and grease cups.
8 pcs together.
1 pc 1" flat & 1 - 1/2" rd. belting
6.5 x 8.5 x 37.5
34 #

#12 [illegible] Frames
36x35x19 = 139 — 236#

#13 Screen Frames
37x35x19 = 15 — 24[illegible]#

#14 Screen Frames
36x35x19 = 13.9 — 227#

[illegible] 1 [illegible]
1 [illegible] "
1 Wooden pulley for feed drum
6x28x28 = 2.73 — 83#

#16 1 set patterns
1 magnet, wire, cord, pulley
+ key
32x20x20 7.4 — 192#

#17 1 Screen Roller with shaft
bearings, grease, cups.
2 sides of tailings gate
2 " " Cone "
3 U pins
8 bags bolts
1 bundle stay pcs of sep. sides
1 Screen Hook
12.5 X 14.5 X 80 = 8.4 — 380

#18. 2 pcs Reconcentrator
1 pc sep bottom
2 " sep sides
1 " " "
12.5 X 34.5 X 59 = 14.8 — 311

#19 Screens on frames
Screen frames
31.5 X 24 X 19 = 8.35 — 126#

#20 CMC Personal
15X26.5X22 = 5.1 — 91#

#21 1 half of Screen chute
91 X 55 X 15.5 = 4.5 430#

#22 1 half of Screen chute
16 X 100.5 X 55.5 = 51.5 434#
1 glass door for sep.
10 gross 3/4 X 12 screws
1 pkg 4" screws
2 pkgs 1/4 X 1/2 ft. Hd.
1 bag 1 1/2 X 8 screws for screens.
1 pkg 1/2" belt couplings.
3 S wrenches
2 monkey wrenches
1 bicycle wrench
10 gross 1 1/2 X 8 screws
1 Can grease
1 - 1" belt for roller feed.
part of 600 - screen angle plates.
1 lot bags,
1 countersink punch + die
10.5 X 19 X 29.5 = 3.41 281#

#2 H G K
40 X 37 X 25 = 21.4 200#

#1 H G K
54 X 35 X 26 = 28.5 223#

#3 H.G.K.

40 X 24 X 20 = 11.1 78#

On Wagon July 14

1st load		2nd load	
H.G.K	#1	#18	CMC
HGK	#2	3	
HGK	#3	22	
CMC	#15	21	
"	#16	17	
"	#8	6	
"	#11		
"	#7		
"	#9		
"	#4		
"	#1		
"	#10		
"	#2		
"	#5		

10½ X 18 X 55

Box #24

1 roll wire cloth	4 pcs sheet iron for [illegible]
1 roll drawings	2 boards for screen frame
~~lot cartridges~~	1 lots large + small bags
2 screen sides	1 lot (5D) .037 screens
	1 box escutcheon pins
	1 lot cleats for screen frame joints
	1 lot screen angle plates
	1 nail puller
	60 pcs wood for hand screens
	1 muzzle

#25 S. Salmond personal

15.5 X 29 X 34 = 8.85 165#

#26

1	lot	.150 ✓
1	"	.118 ✓
1	"	.094 ✓
1	"	.074 ✓
1	"	.059 ✓
1	"	.047 ✓
1	" (5)	.007 ✓
1	" (5)	.029 ✓

9.5 X 13 X 17.5 = 1.25 125#

Total weight CMC cases not including # 24 7028#
Total volume same 295.35 cu ft.

Total weight HGK cases 501#
Total volume same 61 cu ft

Box # 27 — Screen fram angle plates out of box # 24
1 lot ore bags.

Box # 24 Assay odds & ends,
1 lot bags
2 lots cupels

Box # 28 - Scorifiers
Muffle

29 - Rotary Drier 1 ball twine
1 lot bags Towels & soap.
1 box for Little Giant Crusher
Canvas front for screens.

30 4 tubs
3 gold dishes
1 lot Bags

Order

~~Adz & Handle~~ ~~Rennette~~
~~Brace~~
~~Bits~~
~~Saw~~
~~Plane~~
~~Hammer~~
~~Square~~
~~Level~~
~~6 small plates~~

~~10 lbs Test lead~~
~~1 " pure sheet lead~~
~~2 " borax glass lumps~~
~~1 gross 2" Scorifiers~~
~~1 gross 20 gram cupels~~
~~½ oz pure silver foil or thin plate~~
~~2 lbs C.P. Nitric Acid~~
~~1 small pair tweezers for weights~~

Oven
2 Mattresses
3 Springs
Blankets
Pots & Kettles.
2 Wicker Chair.
Tea pot
3 pillows
Porridge Pot
1 boiler
1 egg poacher
1 tea strainer
1 ladle
1 grater.
4 Towels
1 Iron Kettle
2 buckets
1 Dish pan
1 frying pan
1 bake pan
3 pie dishes
1 wash basin
1 water jug
1 bread dish
Meat Platter
carving knives

2 bags chaff
2 bu corn
Lamp
Oil

12" Fairbanks pulley
Big screens
~~[illegible]~~
Bottle box
~~albany grease #3~~
~~[illegible]~~
Hand screen boxes
2 - $1\frac{15}{16}$" Collars
~~4 Gross 3/4" X 12 screws ft H.W~~
1 Can P&B paint
Paint brushes
200 mesh wire cloth.

14X17X23 32-6

John Lomax

Notebook, N-03-12-18

[ITEM FOUND IN BOOK]

1903

[ITEM FOUND IN BOOK]

Rafn —

Make following with metals powdered by filing

Tin — Zinc — Cadmium, Lead — Copper, Silver — Antimony Selenium

Tellurium, Arsenic, Tungsten, (in bare a bottle powdered), ferromanganese

Nickel — Iron — Cobalt Magnesium — Aluminum Carbon,

Sulphur — Red or amorphous phosphorus, Mercury amalgam solid

Silicon — Bismuth, platina, palladium — Rhodium, Iridium

Iridosmine — Zirconium — Thallium — Indium Ruthenium

Put the metals together on one slide —

additional minerals —

- Pyrolusite
- Peroxide of Lead
- Galena
- Chalcopyrite
- Tungstate Calcium fused
- Sulphide of Nickel
- Stobie Nickel ore pyrites
- " " gangue
- Willemite
- Carborundum
- Emery
- Chromite
- Strontium Sulfide fusion
- Balmains Luminous paint
- Crude Barium Sulfate on my desk
- Some alleged platinum ore " "

all the Iron ores in glass jars & other places in Library

Cassiterite or Stream tin

Select different looking samples & make a separate hole for each kind

Break off piece of the Diamond from Blue Mass from the Kimberly Diamond mine —

also select from the fluorite in collection, a sample of the several kinds & use a hole for each —

Dont forget the box of samples where I eat my Lunch which came from Edison N.J. — make separate slide

[ITEM FOUND IN BOOK]

[ON BACK OF PRECEDING PAGE]

Cuprite coated w Malachite
Bisbee, Ariz

14

Notebook, N-05-02-18

05-07-18

CONTENTS OF THIS BOOK.

2

2/18/05.

Test of Iron Wire Resistance Lamp.

Lamp made by Dalley 2/17/05. It contains about 56 inches of wire made by twisting 2 strands of .004" wire together. When tested on vacuum pump at .400 amps current, it showed 56.7 ohms res.

TIME	AMPS.	VOLTS	OHMS.	
A.M. 11.30	.050	.535	10.7	
	.100	1.215	12.15	
	.150	2.265	15.1	
	.200	4.28	21.4	
	.250	6.90	27.6	
	.300	10.38	34.6	
	.350	14.62	41.75	
	.400	21.2	53	
	.450	25.4	56.4	
P.M. 2.00	.500	34.	68.	Glowing bright red.

Current at each point for 15 min.

When .500 amps had been on lamp for about 5 minutes, volts at terminals dropped down to 31.7 from 34. Then put current down to .400 again and found the voltage now would not go above 14 and later fell to 12.

3/18/05. - When a lamp is heated up by a flame the H_2O on the glass is vaporized and conducts the heat away from the wire, consequently lowering the resistance of the wire temporarily.

Evidently some change has come about from the heating up at the high rate. Is it caused by occluded gas?

Have noticed the same thing when a lamp on the pump was heated up with a flame, i.e. the drop would always go down, but in that case it gradually came up again as the tube cooled off.

2/19/05. - Took CR drop @ .400 amps. again this morning and found it to be 11 volts or 1 volt lower than last time yesterday. Then took readings at differant rates again as follows

AMPS.	VOLTS.	OHMS.
.050	.515	10.3
.100	1.035	10.35
.150	1.60	10.67
.200	2.255	11.27
.250	3.15	12.6
.300	4.3	14.32
.350	6.60	18.86

6

7

C	E	R	
.400	11	27.5	
.450	19	42.25	
.500	28.9	57.8	
.550	38.7	70.4	Bright red.
.600	49	81.7	
.400	8.44	21.8	1.00 P.M.
"	7.9	19.75	1.40 "

19.75 ω. = 34.8 o/o of original resistance.
The heating up of the wire to high temperatures seems to affect its resistance more than anything else. Perhaps the annealing it gets from being heated up by the high current and then cooling slowly as it would in a vaccuum, softens it and lowers the resistance in this way.

Iron Wire Lamp made by Dalley 3/7/05. New .005" wire single. Support 18" long.

TIME	AMPS.	VOLTS	OHMS.	
	.400	34.5	86.2	on pump.
A.M. 11.00	.300	16.5		
	.400	34.2		
"	.500	60.8		
11.10	.400	31.4		
P.M. 1.45	"	27		
5.40	"	23.7		
A.M. 7.00	"	20		3/8
8.20	.500	43.7		
9.00	"	37.1		
10.45	"	32		
P.M. 3.00	"	29		
"	.400	13	32.5	
4.30	"	12.7		
A.M. 7.00	"	12.6		3/9
10.00	"	12.7	31.7	

Put on pump again and heated up to red for ½ hour.

(OVER)

3/15/05. The fall in resistance cannot come from softening of the wire because in that case it would not come up again when the lamp was re-exhausted.

It is evident that something gets in which conducts the heat away. It is most likely that when the wire is heated up, gases which have been occluded by the Fe are slowly driven off and partly fill the vacuum. Should think however that these could be nearly all gotten rid of by the second exhausting.

A.M. 11.10	.400	34.2	85.5	3/9/05
P.M. 1.10	"	29.7		
"	.460	44.3		
3.15	"	31.8		
5.50	.400	17.2		
A.M. 8.50	"	16.5		3/10
"	.480	32		
10.30	"	29.7		
"	.500	35		
5.10	"	28		
"	.400	13.3		
A.M. 8.30	"	12.6		3/11
P.M. 2.15	"	13		
"	.500	29		
A.M. 7.10	"	28.7		3/12
P.M. 4.40	"	26.2		
A.M. 8.20	"	28		3/13
"	.400	12.8		off
	Stood 24 hrs.			
A.M. 10.15	.400	12.8	32	3/14

Filled lamp with hydrogen then put on pump and kept wire heated up to red while exhausting.

(OVER)

P.M. 6.00	.400	34	85	3/15/05
A.M. 8.40	"	31.5		3/16
"	.450	43.6		
9.20	"	42.5		
"	.500	57.2		
10.30	"	50		
P.M. 7.00	"	39.8		
A.M. 9.00	"	39		3/17
"	.400	17.3		
P.M. 1.00	"	16.4		
"	.500	39.8		
4.00	"	38.2		
"	.400	17		off
A.M. 8.30	.400	16		3/18
"	.500	39		
P.M. 5.20	"	34		
"	.400	14		
A.M. 9.00	"	14.8		3/20
"	.500	39		
A.M. 8.30	"	39		3/21
"	.400	16.8		
10.00	"	16		
P.M. 12.30	"	1.6	40	off

3/8/05.

New Tantalum Incandescent Lamp.
Frosted. 110 V., 25 C.P. Hefner
22 B.C.P.

Tested at different amperes to get the effect of temperature on the resistance.

AMPS.	VOLTS. #1	VOLTS. #2.	OHMS #1	OHMS. #2.		
.150	33	31.5	220	210		
.200	49.6	46.9	248	234.5		
.250	68.2	64	277.7	256		
.300	87.8	82.6	292.7	275.4		
.350	107.8	101.5	308	290		
.356	110		309.		1.78	watts per B.C.P.
.372		110.		295.8	1.86	" "

Put the two lamps in multiple to see if we could use them for resistance on the small cell Endurance.

.350	40.9	116.8
.400	49.2	123
.450	58	128.8
.500	67	134

Resistance in air of .003" Pt wire. Used 30.5 inches.

.200 amps.	9 V. drop	=	45 ω	resistance
.300 "	14 "	=	46.6	"
.400 "	19.4 "	=	48.5	"
.500 "	25.9 "	=	51.8	"

3/25/05

Lamp made of #34 (.0063") Climax Resistance wire. 15" support = about 61.5" of wire.

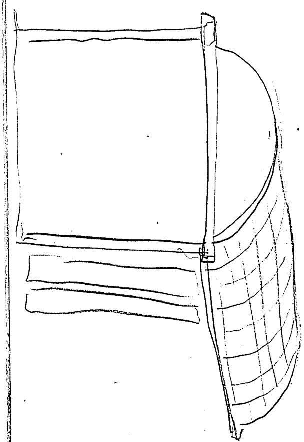
.200 amps.	16.2 V.	= 81 ω res.				
.300	"	25.4 "	= 84.5	"		
.400	"	35 "	= 87.5	"		
"	"	34.5 "	= 86.2	"	after $1\frac{1}{4}$ hrs.	
"	"	34.5 "	= 86.2	"	"	2 days.

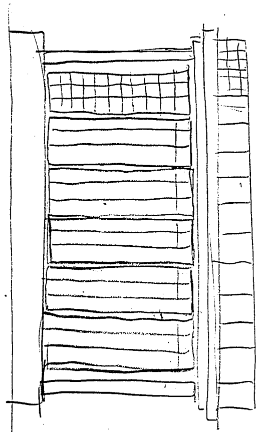
New Edison Lamps.
80 V. 16 C.P.

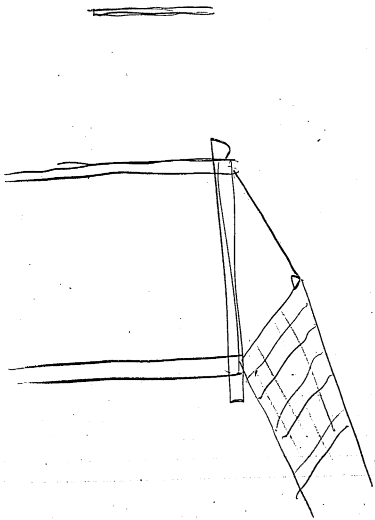
Mil-Amps.	Volts #1	Volts #2	Volts #3	Ohms. #1
100	14.6	13.4	14.2	146
200	25.2	23.8	24.7	126
300	35.8	34.2	35.2	119.3
400	46.3	45.2	45.7	115.7
500	57.1	56.9	56.8	114.2
702	80			113.9
698		80		
708			80	

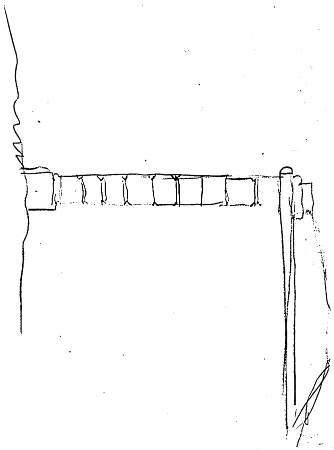
Watts per C.P. #1 = 3.51

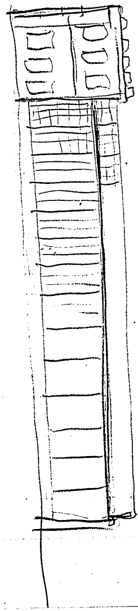
Notebook, N-06-11-21











Notebook, N-05-00-00.5

Experiments in Stereoscopic Photography & Lantern projection

Made stereoscopic pairs of pictures with an ordinary camera using a board on tripod with a slide giving 3" motion & ~~[illegible]~~ used this for ordinary views
For close pictures of small objects kept the camera stationary & rotated the object on a turntable about 10° of the circle
Pairs made by both of these methods showed good relief in a stereoscope.
Made pairs of lantern slides from these negatives & projected on a screen in almost correct register by projecting one through a red glass & the other through a green glass. & used similar coloured glass over the eyes used the green glass over the left picture & left eye & red over right picture & eye found that the colours did not ballance at all the red altogether too dull & the green picture could be seen through the red glass

SAFRANINE →

SAFRANINE →
synthetic dye
J.B. Burt
1/16/1979

stronger than the red picture

Fixed out & washed a lot of old plates & stained with different strength of the following colours acid green, naphthol green, saffranin, erythrosin after considerable experiment chose the following stains.

For the green projecting glass

acid green 3% 5 minutes

For the green spectacle glass.

acid green 1% 5 minutes

For the red glass both projecting & viewing

Saffranin 1/2 % 2 minutes

This combination made each eye see a different picture & 1 picture only if the colours were used any lighter the other picture began to be slightly visible

the sense of relief with this ~~col~~ combination is excellent & the resulting picture fairly white though the eyes change a little the picture is at times red & at times green.

Spectroscopic examination of the stained glass.

Ordinary red glass passes red orange & a slight yellow the red considerably dimmed

Ordinary ~~green glass~~ passes the green a little dimmed, most of the yellow ~~& at least~~ extends at least half way into the red & also passes some distance into the blue

Erythrosine 1% stained 10 minutes passes the red full strength most of the yellow completely blocks out the green except a very slight bluish green passes considerable blue & the extreme violet is almost untouched

napthol green 3% 5 to minutes

all the colours passed are dulled quite a lot
passes a narrow strip of red close to the yellow, passes yellow, green & so far into blue but all colours dull

napthol green 1% 5 minutes
shows the whole spectrum from dark blue to about half way through the red

Saffranin $\frac{1}{2}$% 10 minutes.

Passes the red & a little yellow up to the faintest suspicion of green the red is distinctly brighter than with ~~blue of~~ red glass. careful looking shows a broad band of very faint violet
Acid green 3% 10 minutes
Passes a dull narrow band in the extreem red cuts off all the light red orange & yellow passes the green to blue about half way into the violet

Spectrum of the colours used

The green projecting glass

Acid green 3% 5 minutes

Passes a little violet the green & blue almost unaltered some yellow & just a suggestion of orange then comes a perfectly black band in the red & a ~~bright~~ certain amount of light passed in the extreme red

The green spectacle glass.

Acid green 1% 5 minutes

Similar to the last but the ~~an~~ far red band is both a little broader & brighter the absorption band in the red is narrower but is still absolutely black the light on the green side of the black band shows a little more of the orange.

The red projection glass.

Saffranin $\frac{1}{2}$% 2 minutes

Passes the whole of the red & orange practically undimmed shows a trace of the red end of the greens then the green & blue are completely blocked out & a faint but very broad band shows in the violet

Notebook, N-07-06-17

07-06-17

Order Number 1939.

June 17, 1907.

Resistance Measurements
of
Thin Films of Metals Plated on Glass by Convection Currents.

Section of film measured will be in each case $\frac{3}{4}$" wide and 1 inch long between contact terminals.

Contact terminals consist of heavy copper sheets cemented on glass with their edges parallel and exactly one inch apart. Three layers of tinfoil are clamped on top of these to form a cushion on which to lay the glass coated with metal. A weight is then placed on top of the glass.

Apparatus.

Ordinary Post-Office Bridge connected up on Wheatstone principle with five storage cells and a D'Arsonval galvanometer.

Galvanometer is provided with a mirror which reflects a ray of light onto a scale at a radius of about 53 inches.

June 17, 1907.

Connected up a coil of known resistance to measure, and check up the bridge. Took following readings:–

1000 : 1000 = 84 : x,

1000 : 100 = 963 : x

1000 : 10 = No balance – Least variation of galvanometer when plugs are all in "C". This shows that 10 ω coil on "B" is disconnected or broken.

This bridge is N.G.

Readings on Bridge #2.

10 : 10 = 98 – : x

100 : 100 = 98 – : x

1000 : 1000 = 98 – : x

1000 : 100 = 978 : x

1000 : 10 = 9787 : x

Bridge #2 seems to be O.K.

June 18, 1907.

Connected a standard ohm up with about 2 feet of lamp cord. Results —

$1000 : 10 = 102.5 : x$
$x = 1.025\ \omega$

Value is high because temperature is 24°C instead of 15° as prescribed and also on account of the lamp cord and contacts in circuit.

June 19, 1907.

Said heavy copper strip, the same size as the glasses, across terminals to measure resistance of the connecting wires and contacts.

Results:—

With pressure of 335 grams

$1000 : 10 = 1.7 : x$

$x = \underline{.017 \ \omega}$

With pressure of 1075 grams

$1000 : 10 = 1 : x$

$x = \underline{\underline{.01 \ \omega}}$

Opaque film.

6/19/07.

J.A.Z. #7.
Platinum - $3\frac{3}{4}$ hrs. plating

Plate #1.
Pressure 335 grams
1000 : 10 = 506 : x
x = 5.06 ohms.

Plate #2.
Pressure 335 grams.
1000 : 10 = 838 : x
x = 8.38 ω

Plate #3.
Pressure 335 grams.
1000 : 10 = 705 : x
x = 7.05 ω

Plate #4.
Pressure 335 grams.
1000 : 10 = 1908 : x
x = 19.08 ω

Hard to balance galvanometer - Resistance of contact between film + foil must vary.

6/19/07.

Platinum - $3\frac{3}{4}$ hrs. plating

Repeat previous test and also test using more pressure

Plate #1.

Pressure 335 grams

$1000 : 10 = 1800 : x$

$x = \underline{18}\ \omega$

Did not disturb plate but tried again a few minutes later -

$1000 : 10 = 870 : x$

$x = \underline{8.7}\ \omega$

Kept key pressed down and adjusted galvanometer to 0 instead of taking instantaneous reading -

$1000 : 10 = 859 : x$

$x = \underline{8.59}\ \omega.$

Instantaneous reading few minutes later again -

$1000 : 10 = 872 : x$

$x = \underline{8.72}\ \omega.$

6/19/07.

Platinum - $3\frac{3}{4}$ ins. plating

Plate #1.

Pressure 1152 grams

1000 : 10 = 630 : x

x = 6.3 ω

Still hard to balance galvanometer. If key is held down gal. will apparently assume a constant position and then suddenly it will oscillate vigorously for no evident reason.

Pressure 2127 grams

1000 : 10 = 598 : x

x = 5.98 ω

Pressure 3267 grams

1000 : 10 = 565 : x

x = 5.65 ω

These pressures give fairly constant results.

6.22
8.19
6.46
6.52
4)27.39
6.847 ω average of values

on opposite page for Platinum

plated $3\frac{3}{4}$ hrs. (Momentary method)

Film is opaque.
Color is white but is tinged here and there with straw color.
Makes a perfect mirror.

6/19/07.

Platinum – $3\frac{3}{4}$ hrs. plating

Pressure in each case 2450 g.

Plate #1.
Momentary current = 6.22 ω
Continuous " = 6.00 ω

Plate #2.
Momentary current = 8.19 ω
Continuous " = 8.40 ω

Plate #3.
Momentary current = 6.46 ω
Continuous " = 7.36 ω

Plate #4.
Momentary current = 6.52 ω
Continuous " = 6.50 ω

Momentary current method is most convenient and values seem to be fairly constant so hereafter that method will used.

6/19/07.

Platinum 1 mm^2 in section by 1 meter long, resistance = .0898 ω

R of same section but 1 inch long. = .0898 x .0254 = .00228092 ω.

But R of film 1 inch long was found to be 6.847 ω or 3001.85 times this value –

∴ The section area of the film is $\frac{1}{3001.85}$ = .0003331 mm^2.

Film is approximately $\frac{3}{4}$ inch wide or 19.05 mm.

∴ Its thickness would be $\frac{.0003331}{19.05}$ = .00001748 mm.

Or .00001748 x .03937 = .00000068818 inches thick.

$$\begin{array}{r} .0898 \\ .0254 \\ \hline 3592 \\ 4490 \\ 1796 \end{array}$$

.00228092) 6.84700000 (3001.85
684276
424000
228092
1959080
1824736
1343440
1140460
202980

3001.85) 1.000000 (.0003331 mm^2
900555
994450
900555
938950
900555
383950
300185

19.05) .0003331 (.00001748 mm
1905
14260
13335
9250
7620
16300
15240

$$\begin{array}{r} .00001748 \\ \times .03937 \\ \hline 12236 \\ 5244 \\ 15732 \\ 5244 \\ \hline .000000688187 \end{array}$$ in.

Opaque film except at ends:
a few scratches and pinholes
can be seen.
Color is white-tinged with
straw color same as $3\frac{3}{4}$ hr.
plate. Film on one side has
mottled appearance.

June 20, 1907.

Platinum - 2 hrs. plating
T.a.Z. #8.

Pressure in each case 2450 g.

Plate #1.	8.12 ω
Plate #2.	14.65 ω
Plate #3.	9.61 ω
Plate #4.	10.62 ω

$4\,\overline{)\,43.00}$

Average - 10.75 ω

These films are translucent.

#1 has few pinholes
#2 " many "
#3 " long scratches + pinholes.
#4 " pinholes

There is metal plated on <u>both</u> sides of glass of all the slides, but the back coating is very thin.

Will measure both sides hereafter so as to be sure of getting the right one.

Looks bluish brown by transmitted light.

6/20/07.

Platinum - 1 hr. plating.
J.A.Z. #9.

Pressure 2450 grams.

<u>Plate #1.</u>	Front	18.38	
	Back		111.2
<u>Plate #2.</u>	Front	29.63	
	Back		52.23
<u>Plate #3.</u>	Front	17.73	
	Back		53.48
<u>Plate #4.</u>	Front	24.48	
	Back		63.01

4) 90.22

Average 22.555 ω

These are very uniform films.
#1 - Very few pinholes.
2 - Perfect coating - no holes
3 - Very few pinholes.
4 - " " "
Film is just transparent.
Looks white tinged with smoky blue by reflected light.
Looks bluish brown by transmitted light.

6/20/07.

Platinum - ½ hr. plating
T.a.3. #10.

Pressure 2450 grams.

Plate #1.	Front	34.42	
	Back		94.51
Plate #2.	Front	39.21	
	Back		84.50
Plate #3	Front	45.83	
	Back		77.88
Plate #4	Front	41.22	
	Back		40.22

4) 160.88
Average 40.22 ω

Very transparent films of great uniformity. All looked exactly alike.
Colors same as ½ hr. film, only thinner.
Repeated measurements on plate #3 three times and got practically the same result each time. For some reason it must have a heavier coating on the back than the others have.

6/20/07.

Platinum - 15 min. plating
J.A.F. #11.

Pressure 2450 g.

Plate #1.	Front	149.	
	Back		1892
Plate #2.	Front	140.3	
	Back		1708
Plate #3.	Front	202.7	
	Back		445.4
Plate #4.	Front	211.7	
	Back		1584

4) 703.7
Average 175.9 ω

Very transparent.
Colors by reflected and transmitted light same as 15 min film, only thinner.

6/20/07.

Platinum - $7\frac{1}{2}$ min. plating.
J.A.E. #12.

Pressure 2450 g.

Plate #1.	Front	168.3	
	Back		33390
Plate #2.	Front	140.2	
	Back		69990
Plate #3.	Front	157.8	
	Back		515000
Plate #4	Front	134.8	
	Back		15040

4) 601.1
Average 150.27

A very slight coloration of the glass can barely be seen.

With resistances on bridge arranged to give highest possible measurement - i.e. 10 : 1100 = 10000 : x — galvanometer was still deflected to the low side.

The deflection in each case was 29 mm, which was found to be the same amount as when no connection was made across the contact terminals except thru the air and the glass support.

This shows that the resistance of the one minute platinum film is infinite.

June 21, 1907.

Platinum - 1 min. plating. J.a.B. #13.

Pressure 2450 g.

Plate #1.	Front Back	Greater than 1.100.000 ohms
Plate #2.	Front Back	Same
Plate #3.	Front Back	Same
Plate #4.	Front Back	Same

6/21/07.

Tabulated Results on Platinum.
J.a.Z. #7 - 13.

All measured under pressure of 2450 grams.

Average taken of four plates in each case.

#7	Plated	$3\frac{3}{4}$ hrs.	Iron	Coating	=	6.847 ω
8	"	2	"	"	"	10.75
9	"	1	"	"	"	22.55
10	"	$\frac{1}{2}$	"	"	"	40.22
11	"	15 min.	"	"	"	175.9
12	"	$7\frac{1}{2}$	"	"	"	150.27
13	"	1	"	"	"	Infinite

Opaque film
Makes a perfect mirror.
Metal is white by reflected light but has bluish gray markings on the back.

6/21/07.

Nickel - 4 hours plating.
J.a.Z. #2.

Pressure 2450 grams.

	Front	Back
Plate #1	6.27	14.94
Plate #2	4.96	15.76
Plate #3	7.42	24.59
Plate #4	6.87	125.0

4)25.52
Average 6.38 W

Transparent.
Film looks brown by transmitted light.
By reflected light it is white just tinted with yellow.

6/21/07.

Nickel - 2 hrs. plating
T.a.E. #3.

Pressure 2450 grams.

	Front	Back
Plate #1.	57.78	6565.
Plate #2.	52.88	249.8
Plate #3.	48.16	1475.
Plate #4.	25.47	190.0

4) 184.29
Average - 46.07 ω

6/21/07.

Nickel - 1 hr. plating
J.O.Z. #4.

Pressure 2450 grams.

	Front	Back
Plate #1.	421.3	769.3
Plate #2.	115.3	2332.
Plate #3	47.37	500.5
Plate #4.	139.6	298.7

4) 743.57
Average 185.89 ω

6/21/07.

Nickel - ½ in. plating
J.A.Z. #5.

Pressure 2450 grams

	Front	Back
Plate #1.	469.8	225000
Plate #2.	429.0	29.000
Plate #3.	341.9	1902
Plate #4.	357.2	154000

4 | 1597.9

Average 399.47 ω

6/21/07.

Nickel - 15 min. plating
T.a.E. #6.

Pressure 2450 grams

	Front	Back
Plate #1.	7157	Over 1000000
Plate #2.	2406	"
Plate #3.	4453	"
Plate #4.	4480	"
	4 | 18496	
Average	4624	"

6/21/07.

Tabulated Results on <u>Nickel</u>.
T.a.E. #2-6.

All measured under pressure of 2450 grams.

Averages of the four plates -

#2	Plated	4	hrs.	Front	Coating	= 6.38 ω
3	"	2	"	"	"	= 46.07
4	"	1	"	"	"	= 185.89
5	"	½	"	"	"	= 399.47
6	"	¼	"	"	"	= 4624.0

These are all more or less oxidized.
Film on front is pinkish violet – but it is not oxidized right down to the glass as a patch of pure copper color shows thru the glass from the back.
Film is opaque.

June 24, 1907.

<u>Copper</u> – 4 hrs. plating.
Exp. #14.

Pressure 2450 grams.

	<u>Front</u>	<u>Back</u>
Plate #1	.585	.87
Plate #2	.39	.515
Plate #3	.315	.46
Plate #4	.507	.775

$4 \overline{)1.797}$

Average .449 ω

All more or less oxidized.
Translucent.
Look pinkish violet by reflected light + greenish black by transmitted light. Vari-colored bands on back.
Plate #2 is not oxidized as badly as the others and looks reddish violet by transmitted light.
All the plates have pinholes and #3 + #4 are scratched badly.

6/24/07.

Copper - 2 hrs. plating
Exp. #15.

Pressure - 2450 grams

	Front	Back
Plate #1.	16.48	Over 1000.000
Plate #2.	7.21	"
Plate #3.	11.76	"
Plate #4.	12.79	"
	4 | 48.24	
Average	12.06	Ω

Transparent Films.
As seen by reflected light, films have a complex coloring. There is some bright yellow on the edges and pale blue with traces of red in the center. There is also a tinge of green where the yellow merges into the blue.
By transmitted light the main part of the film looks greenish yellow and the edges brownish yellow.
There are some scratches and pinholes on all of these and #3 has a mottled appearance.

June 25, 1907.

Copper - 1 hr. plating.
Exp. #16.

Pressure - 2450 grams.

	Front	Back
Plate #1.	Over 1,000,000.	Over 1,000,000
Plate #2.	"	"
Plate #3.	"	"
Plate #4.	"	"

Front and back in each case measured more than 1,000,000 ohms.

Films are transparent but not so much as the first one, how set. This is because they are oxidized more than the first ones.

By reflected light one side of plate appears fairly uniformly blue with a border of yellow, red, blue + green. This is probably the back side. The other side is very beautiful. It has a little yellow in the center - then comes the main part which is red. This has a border all around consisting of blue merging into green and then yellow again.

By transmitted light, center of plate is yellowish green and edge is pure yellow.

6/25/07.

Copper - 1 hr. plating
Exp. #17.

Pressure 2450 grams.

	Front	Back
Plate #1.	Over 1.000.0.00.	Over 1.000000
Plate #2.	"	"
Plate #3.	"	"
Plate #4.	"	"

Front and back in each case measured more than 1,000,000 ohms.

Transparent films not quite as heavy as #17.

By reflected light the colors of the front and back correspond to those of #17 only they are in no regular order from center to edge but are very much mixed up. Blue seems to predominate rather than red and the film has a heterogeneous, mottled appearance.

By transmitted light film is greenish yellow with blotches of green in central part.

Could see no difference be- #4, which had comparatively low resistance, and the others except that it is perhaps more mottled.

6/25/07.

Copper - 1 hr. plating.
Exp. #18.

Pressure 2450 grams.

	Front	Back
Plate #1.	18500	Over 1000000
Plate #2.	884000	"
Plate #3.	Over 1000000	"
Plate #4.	57.35	"
	4 / 1902557.35	
Average	475639.33	ω

Very transparent.
Looks a very pale blue with tinges of straw color by reflected light.
Scarcely any color can be seen by strong transmitted light but if plate is laid on white paper it is seen to have a delicate yellow color with just a suggestion of green.

6/25/07.

Copper - ½ in. plating
Exp. #19.

Pressure 2450 grams.

	Front	Back
Plate #1.	Over 1.000.000.	Over 1.000000.
Plate #2.	"	"
Plate #3.	"	"
Plate #4.	"	"

Film blue tinged with yellow by reflected light.
When laid on white paper it appears bluish green with tinges of yellow.
Very transparent but not so much so as #19 on account of the different color.

6/25/07.

Copper - $\frac{1}{2}$ in. plating.
Exp. #20.

Pressure 2450 grams.

	Front	Back
Plate #1.	731.8	Over 1000.000
Plate #2.	540.9	"
Plate #3.	192.8	"
Plate #4.	343.0	"
	4 | 1808.5	
Average	452.1	w.

Very transparent and clear.
Misty blue by reflected light.
When laid on white paper it appears pale orange in color.

6/25/07.

Copper - $\frac{1}{2}$ in. plating
Exp. #21.

Pressure 2450 grams.

	Front	Back
Plate #1.	Over 1000.000.	Over 1.000.000
Plate #2.	"	"
Plate #3.	"	"
Plate #4.	"	"

June 26, 1907.

Tabulated Results on <u>Copper</u>
Exp. # 14 - 21.

Contact Pressure 2450 grams.

Each figure is the average of four plates - front coating.

#14.	Plated	4	hrs.	.449 ω
15.	"	2	"	12.06 "
16.	"	1	"	Infinite
17.	"	"	"	"
18.	"	"	"	475639.33 "
19.	"	½	"	Infinite
20.	"	"	"	452.1 "
21.	"	"	"	Infinite

The different degrees of oxidation of the copper probably accounts for these irregular results.

Translucent.
By reflected light the film is white but is stained considerably with brown, especially on the front.

By transmitted light the color is brownish blue.

6/26/07.

Bismuth - 1 hr. plating.
Exp. #24.

Contact Pressure 2450 grams.

	Front	Back
Plate #1.	329.0	868.3
Plate #2.	396.7	688.2
Plate #3.	317.6	432.8
Plate #4.	263.0	479.5

4)1306.3
Average 326.57 ω

Transparent
Both sides look bluish brown by reflected light.
Looks blackish blue by transmitted light.

6/26/07.

Bismuth — $\frac{1}{2}$ hr. plating.
Exp. #25.

Contact Pressure 2450 grams.

	Front	Back.
Plate #1.	Over 1.000.000.	Over 1000.000.
Plate #2.	"	"
Plate #3.	"	"
Plate #4.	"	"

Looks like clear white glass but a closer examination reveals a very delicate bluish white film.

6/26/07.

Bismuth $\frac{1}{4}$ hr. plating.
Exp. #26.

Contact Pressure 2450 grams.

	Front	Back
Plate #1.	Over 1000.000.	Over 1000.000
Plate #2.	"	"
Plate #3.	"	"
Plate #4.	"	"

6/26/07.

Results on Bismuth
Exps. # 24 - 26.

Contact Pressure 2450 grams.

Average for the four plates
of each set - front coating.

#24	Plated	1 hr.	326.57 W.
25	"	$\frac{1}{2}$ "	Infinite
26	"	$\frac{1}{4}$ "	"

Film is transparent.
Film has tints of blue & yellow by reflected light and looks reddish brown by transmitted light.

6/26/07.

Tungsten - 12 hrs. plating
Exp. # 23.

Contact Pressure 2450 grams.

	Front	Back
Plate # 1.	575.8	440500
Plate # 2.	415.0	28770
Plate # 3.	414.5	19390
Plate # 4.	330.6	45000

4) 1735.9
Average 433.97 w

Transparent film.
By reflected light, film has an even pale blue tint on both sides.

By transmitted light it is a neutral brown color.

6/26/07.

Tungsten - 4 hrs. plating.
Exp. #22.

Contact Pressure 2450 grams.

	Front	Back
Plate #1.	985.5	Over 1000000
Plate #2.	826.6	985000
Plate #3.	664.7	148400
Plate #4.	887.6	Over 1000000

4 | 3364.4

Average 841.1 ω.

Radium Effect.

June 27, 1907.

Platinum 3 3/4 hrs. Plate #1. Reg. Press.
R by Closed Circuit Method 5.00 ω
Kept switch closed and brought tube of Radium beneath the glass support and about 1/2 inch below the metallic film. It did not affect the balance of the galvanometer.

Platinum 1 hr. Plate #1. Reg. Press.
R by Closed Circuit Method 21.50 ω
Subjected to influence of Radium as above with no effect on resistance.

Platinum 15 min. Plate #1. Reg. Press.
R by Closed Circuit Method 149.8 ω
Resistance unaffected by Radium emanations.

6/27/07.

Nickel 2 hrs. Plate #1. Reg. Press.
R by Closed Circuit Method 69.8 ω
Subjected to influence of Radium as Platinum was subjected before, and found that conductivity of the Nickel remained unchanged.

Copper 2 hrs. Plate #1. Reg. Press.
R by Closed Circuit Method 15.78 ω
Conductivity unaffected by influence of Radium.

Bismuth 1 hr. Plate #1. Reg. Press.
R by Closed Circuit Method 280 ω
Conductivity unaffected by influence of Radium.

Tungsten, 12 hrs. Plate #1. Reg. Press.
R by Closed Circuit Method 331. ω
Conductivity unaffected by influence of Radium.

June 28, 1907.

Focused a direct vision spectroscope on an acetylene flame to get a continuous spectrum, and then placed transparent films of various metals in front of slit to see if they gave any absorption lines.

Results —

__Platinum.__

Dims whole spectrum. No dark lines visible.

__Nickel.__

Same as above.

__Copper.__

Same

__Bismuth__

Same

__Tungsten.__

Same.

Transparent Film
By reflected light film looks brown in center of plate and bluish gray at the edges.
By transmitted light it is light brown in center and dark brown at the edges.

June 29, 1907.

Resistance Measurement.
Iron - 12 hrs. plating.
Exp. # 27.
Contact Pressure 2450 grams.

	Front	Back
Plate # 1.	614.8	1349.0
Plate # 2.	935.0	919.0
Plate # 3.	1328.0	569.1
Plate # 4.	828.0	1112

4) 3705.8
Average 926.4 ω

White by reflected light.
Makes a very fine mirror.
Film is just translucent to strong light.
Color by transmitted light is pure blue.

6/29/07.

Resistance Measurement.
Silver - 45 min. plating.
Exp. #28.
Contact Pressure 2450 grams.

	Front	Back
Plate #1.	1.63	11.88
Plate #2.	2.18	7.07
Plate #3.	1.62	3.63
Plate #4.	1.43	12.29

4 | 6.86
Average 1.715 ω

July 1, 1907.

Effect of Magnetism on Resistance.

Used the large electromagnet across the 120 volt line, making a very strong field. Spread pole pieces as far apart as they would go (about $2\frac{1}{4}$"), and laid the contact plate on a sheet of mica on top of the poles so that the metal film would come over the gap.

Had to use heavy lamp cord to connect from terminals to bridge.

Resistance of wires and contacts with a piece of copper, under pressure of 2535 grams, short-circuiting terminals, was .024 ω. This value was unaffected by magnetism.

For accurate work this amount should be subtracted from the values given on the following pages.

7/1/07.

Effect of Magnetism on Resistance
Contact Pressure 2535 grams.
Nickel.

4 hr. - Plate #1.

Resistance 5.35 ω. Very slightly affected by magnetic field - not enough to measure. If contact key is held down with galvanometer balanced, and magnetising current switch is closed, galvanometer will be deflected about 10 mm. to the low side showing that resistance of Ni is increased slightly in a magnetic field. When field is thrown off again with contact key still down, galvanometer does not swing back to zero immediately but comes rather slowly.

2 hr. - Plate #1.

Resistance 39.61 ω.

The resistance of this film did not seem to be affected in

7/1/07.

the least by magnetism. Galvanometer balance was not disturbed appreciably when current was switched on and off thru field coils.

1 in. Plate #1. Ni
Resistance 306.2 ω.
Resistance remains the same in the magnetic field – same result as with the 2 in. plating

½ in. Plate #1. Ni
Resistance 389 ω. – Unaffected by magnetism.

Repeated experiment on the 4 in. plating and got same result as before i.e. – resistance was slightly higher in the field. This result was obtained with the magnetic lines of force running lengthwise of the film, that is, parallel with the current.

7/1/07.

Now tried the same 4 In. Nickel film with the lines of force running across the film or perpendicular to the current. Result - the resistance was not affected by magnetism running in this direction.

Also on the same film, tried the effect of reversing the direction of the magnetic flux with respect to the flow of current thru the film - when the lines of force were parallel to the current as originally. Result - the deflection of the galvanometer was to the low side as before, showing that the resistance of the film was slightly increased when the film was traversed lengthwise by magnetic lines in either direction, and that the resistance was unaffected by magnetic lines traversing it crosswise.

7/1/07.

Platinum. $3\frac{3}{4}$ hrs. Plate #1.
Resistance 7.3 w. Unaffected by magnetic flux in either direction.

Platinum 2 hrs. Plate #1.
Resistance 8.68 w. Unaffected by magnetic flux in either direction.

Platinum. $\frac{1}{2}$ hr. Plate #1.
Resistance 28.48 w. Unaffected by magnetic flux in either direction.

Copper. 4 hrs. Plate #1.
Resistance .66 w. Unaffected by magnetic flux in either direction.

Copper. 2 hrs. Plate #1.
Resistance 19.90 w. Unaffected by magnetic flux in either direction.

7/1/07.

Tungsten. 12 hrs. Plate #1.
Resistance 378.4 w. Unaffected by magnetic flux in either direction.

Tungsten. 4 hrs. Plate #1.
Resistance 1331 w. Unaffected by magnetic flux in either direction.

Bismuth. 1 hr. Plate #1.
Resistance 348.7 w. Unaffected by magnetic flux in either direction.

Iron. 12 hrs. Plate #1.
Resistance 1281 w. Unaffected by magnetic flux in either direction.

Silver. 45 min. Plate #1.
Resistance 279. w. Unaffected by magnetic flux in either direction.

July 3, 1907.

Absorption Spectra.

Silver. 45 min. Plate #1.

This is the one that looks deep blue by transmitted light.

Film is too dense to pass a bright spectrum when it is interposed between slit and flame.

A little red and orange shows up dimly. Hardly any yellow shows but green and blue are quite bright. Violet can just be made out.

No dark lines are visible.

Plates #2, 3, + 4 corresponded with plate #1.

Silver. 22 min.

Film is quite thin and when one plate only was interposed, spectrum was just dimmed very slightly. Two plates increased the effect

7/3/97

and the yellow seemed to be absorbed more than the other colors. No dark lines were visible.

<u>Silver</u>. 11 min.

Three plates interposed at once merely dimmed the whole spectrum. No dark lines.

<u>Silver</u>. 5 min.

Four plates interposed merely dim the whole spectrum.

<u>Silver</u>. 30 min.

Looks blue by transmitted light but could not make out any absorption effects with the spectroscope. All the colors were dimmed uniformly.

7/3/07.

The metals tried for absorption spectra on June 28th, I now tried over again using thicker films - as the results obtained then were on the thinner plates.

Metals tried were -

Nickel
Platinum
Copper
Tungsten
Bismuth
Iron

There was no change in the results i.e. - they all dimmed the *whole* spectrum without regard to the colors. Even the copper films which were some of them highly colored when viewed by transmitted light, showed no appreciable selective absorption.

See next page.

July 5, 1907.

Resistance Measurement.

Silver. 22 min. plating
Exp. # 29.
Contact Pressure 2450 grams.

	Front	Back
Plate # 1.	Over 1.000.000.	Over 1.000.000.
Plate # 2.	"	"
Plate # 3.	"	"
Plate # 4.	"	"

Deposit rubs off very easily. Plate #1 was scratched considerably by brushing with a camel-hair brush.

By reflected light, color is white -tinted with blue, pink, + yellow.

Pinkish-brown by transmitted light.

Pale blue, pink and straw-color by reflected light.

By transmitted light color is greenish blue in thinner parts and pinkish brown in thicker parts of film.

Same colors as #30 by reflected and transmitted light only thinner.

7/5/07

Resistance Continued.

Silver. 22 min plating

Exp. # 29.

Contact Pressure 2450 grams.

Front and back coatings of all four plates measure more than 1.000.000 ohms.

Silver. 11 min plating

Exp. # 30

Contact Pressure 2450 grams.

Front and back coatings of all four plates measure more than 1.000.000 ω.

Silver. 5 min plating.

Exp # 31

Contact Pressure 2450 grams.

Front and back coatings of all four plates measure more than 1.000.000 ω.

By reflected light, film is white with slight tinges of blue and pink.
By transmitted light it is blue and violet.
Transparent Film.

7/5/07.

Resistance Continued.

Silver. 30 min plating.
Exp. #32.
Contact Pressure 2450 grams.

	Front	Back
Plate #1.	9.49 ω	Over 1000.000.
Plate #2.	5.67	"
Plate #3.	9.71	"
Plate #4.	111.8	"

Average of Plates #1, 2, +3 = 8.29 ω

By reflected light film is straw color with tinges of blue and pink.
By transmitted light film is blue and violet.

By reflected light film is straw color with here and there a small blue spot.
By transmitted light film is blue and the same spots are yellowish.

7/5/07.

Resistance Continued.

Silver. 5 min. plating - after current was passed for 1 hr to get rid of all traces of oxygen. Exp. # 33.
Single slide was plated in middle of tube. Rubbed the deposit off of the edges so as to disconnect the two sides. Resistance, using usual contact pressure of 2450 grams, then was -

One Side 19.43 ω.

Other Side 21.39 ω.

Silver. 2 min. plating after sparking free of oxygen as above.
Exp. # 34.
Contact pressure 2450 grams.
Both films have more than 1000000 ohms resistance.

7/5/07.

Effect of Magnetism on R.

Had a brass clamp made to press plates on contact terminals, instead of using weights, so that film could be put between the poles of magnet edgewise - that is, so that the plane of the film is perpendicular to the magnetic lines of force. Pole pieces of magnet are about one inch apart.

Contact pressure is unknown but it is the same for both readings on the same film.

Nickel. 4 hrs. Plate #1.
Resistance 5.07 ω. Decreases a very little in magnetic field - less than .01 ohm.

Nickel. 2 hrs. Plate #1.
Resistance 27.08 ω. Decreased to 27.04 ω in magnetic field on first trial but on two subsequent trials it remained at 27.08 ω both in field and out.

7/5/07.

Platinum. $3\frac{3}{4}$ lns. Plate #1.
Resistance 4.54 w. Unaffected by magnetic flux.

Copper. 2 lns. Plate #1.
Resistance 23.98 w. Unaffected by magnetic flux.

Tungsten. 12 lns. Plate #1.
Resistance 446.5 w. Unaffected by magnetic flux.

Bismuth. 1 ln. Plate #1.
Resistance 406.0 w. Unaffected by magnetic flux.

Iron. 12 lns. 1206 w.
Silver $\frac{3}{4}$ " 2.06 w.
Conductivity of both is unaffected by magnetic flux.

July 10, 1907.

Resistance Measurement.

Silver Films — Plated for different lengths of time after first sparking tube for about an hour to combine all traces of oxygen. Rarified hydrogen was in tube as usual.

Contact pressure in each case will be 2450 grams.

Silver. 5 min. Exp. #33.

$$\left.\begin{array}{ll}\text{One side} & 9.27\ \omega\\ \text{Other ''} & 32.26\ \omega\end{array}\right\}\ 20.76$$

Silver. 4 min. Exp. #39.

$$\left.\begin{array}{ll}\text{One side} & 44.48\ \omega\\ \text{Other side} & 315.18\ \omega\end{array}\right\}\ 180.14$$

Silver 3 min Exp. #40.

$$\left.\begin{array}{ll}\text{One side} & 38.51\ \omega\\ \text{Other ''} & 1027\ \omega\end{array}\right\}\ 532.75$$

By transmitted light the 5, 4 and 3 minute Silver films are blue, the 2 and 1 minute films are blue and yellow, and the ½ min films are mostly yellow. The yellow color varies from a pinkish yellow to straw color.

By reflected light the colors are just reversed, i.e. the blue films look straw color and the yellow films look blue.

Silver. 2 min. # 34.
Both sides over 1000000 ω.

Silver 1 min # 35.
Both sides over 1000000 ω.

Silver ½ min # 36.
Both sides over 1000000 ω.

Silver ½ min # 37.
Both sides over 1000000 ω.

Silver ½ min # 38.
Both sides over 1000000 ω.

July 15, 1907.

Effect of Temperature on Resistance.

The plate carrying the metal film is laid on a small piece of plate glass, and brass contact clamps are adjusted and fastened so that there is an inch of the film between the contact edges. The whole thing is then immersed in a bath of paraffin oil for the measurements.

The temperature of the bath will be maintained at each point five minutes before taking the measurement of resistance.

Platinum. $3\frac{3}{4}$ ins. Plate #3.

Measured resistance in air at 24° C. - which was 4.08 ω. Then immersed in oil at same temp. and measured again. It then was 4.07 ω - showing that the oil is a good insulator.

7/15/'07.

Platinum. 3¾ ins. cont'd.

Resistance at different temperatures was found to be as follows -

TEMP. °C.	RESISTANCE.
25°	4.06 ω
41	4.19
60	4.20
80	4.31
100	4.37
120	4.43
Oil-bath was jarred slightly here.	
140	4.42
160	4.46
180	4.26
200	4.19

July 16, 1907. What film - platinum - 3¾ hrs.

Oil-bath containing film and contact pieces, was left to cool off last night. The connections were not disturbed.

Will now repeat yesterdays test and also take measurements going back down from 200° to normal -

Temp. °C.	Resistance
23°	3.66 ω
40	3.74
60	3.80
80	3.87
100	3.91
120	3.98
140	4.04
160	4.10
180	4.12
200	4.22
180	4.13
160	4.05
140	3.98
120	3.91

Temp.-Resistance Curve, cont'd.

TEMP. °C.	RESISTANCE.
100°	3.86 ω
80	3.80
60	3.74
50	3.715
40	3.69
27	3.665

Increase in resistance for 160° rise in temperature (40° - 200°) is 4.22 - 3.74 = .48 ω or 12.8 o/o.

The temperature coefficient of platinum according to these figures would therefore be .0008 per degree C. This is much lower than the value usually given. Dewar + Fleming give .00367 for Platinum and Matthiessen gives .00247.

July 17, 1907.

Temperature - Resistance Curve

Platinum - 3 3/4 hrs.

Same film that was used yesterday and the day before.

Connections have not been disturbed.

TEMP. °C.	RESISTANCE.
23.5°	3.66 ω
40	3.74
60	3.84
80	3.89
100	3.96
120	4.02
140	4.09
160	4.13
180	4.17
x 200	4.21
180	4.13
160	4.05
140	3.99
120	3.94
100	3.88

Temp.-Resistance Curve, cont'd.

TEMP. °C.	RESISTANCE.
80°	3.82 ω
60	3.76
40	3.69

Very humid day. — Moisture may cause errors in readings.

These films are not plated evenly on the glass. On most of them the metal is deposited the most heavily near one edge and thins down gradually toward the other edge.

By transmitted light the thicker parts of all the films are green, which becomes a yellowish green as the film thins down and finally pale blue in the very thin parts. The "thin plate" of the 1 and 3 minute films are nearly all blue.

By reflected light, films look salmon-pink shading into purple in the thin parts, from the front; and old gold color having a burnt appearance in the thin parts when viewed thru the glass at the back.

7/17/07.

Resistance Measurement.

Contact Pressure 2450 grams.

[illegible] before plating these.

Gold. 5 min. Plating
Exp. #42

Thick Plate		11.94 ω
Thin	"	18.50

Gold. 4 min. Exp. #43.

Thick Plate		16.68
Thin	"	68.85

Gold 3 min. Exp. #44.

Thick Plate		145.1
Thin	"	305000

Gold 2 min. Exp. #45.

Thick Plate		22.30
Thin	"	127.6

Gold 1 min. Exp. #46.

Thick Plate		1901.7
Thin	"	Over 1,000,000

July 18., 1907.

Temperature-Resistance Curve.

Platinum - $3\frac{3}{4}$ hrs.
Same film that has been used before for this test.
Temperature will now be kept at each point 15 minutes before taking the resistance measurement; instead of 5 minutes as formerly.

TEMP. °C.	RESISTANCE.	
25°	3.655 ω.	
40	3.76	
60	3.84	
80	3.90	
100	3.97	
120	4.05	
140	4.11	← Bath jarred by trolley
160	4.12	car and thermometer
180	4.17	fell against contact plate.
x 200	4.22	
180	4.07	
160	4.04	

7/18/07.

Temp. - Resistance Curve, cont'd.

TEMP. °C.	RESISTANCE.
140°	3.98 ω
120	3.93
100	3.89
80	3.84
—	—
25	3.70

These films were tested before for resistance on July 17th which was a very sticky, hot day. The air is dry to-day and the resistance of all but one film is higher.
Glass is hygroscopic and the metals may be, so that the humidity of the atmosphere possibly affects the results.

July 19, 1907.

Resistance Measurements.

Contact Pressure 2450 grams.

Gold.	5 min. Exp. #42.		
	Thick Plate		13.88 ω
	Thin	"	27.62
Gold.	4 min. Exp. #43.		
	Thick Plate		17.71
	Thin	"	79.98
Gold.	3 min. Exp. #44.		
	Thick Plate		618.0
	Thin	"	Over 1000000
Gold.	2 min. Exp. #45.		
	Thick Plate		60.45
	Thin	"	791.7
Gold.	1 min. Exp. #46.		
	Thick Plate		94.2
	Thin	"	Over 1000000

Thick plate is opaque in parts. Thin plate is translucent. Deep bluish green by transmitted light. Pure gold color from either side by reflected light.

Transparent.
Coatings are not as heavy as the 12 hr. platings of Fe (#27) done in the old way without sparking free of oxygen.
By transmitted light color is gray with small yellow spots here and there and numerous pinholes.
By reflected light thin film is gray and thick film is brownish gray. Both have white markings extending up from the lower corners.

7/19/07.

Resistance Measurements, cont'd.

Gold. Exp. #47.
30 minutes plating after sparking tube one hour.

Thick Plate	1.48	ω
Thin "	1.81	

Iron. Exp. #41.
15 hrs. plate after sparking tube one hour.

Thick Plate	725.6	ω
Thin "	584.0	"

Put thick Fe plate in the brass clamp to try effect of magnetism.
Resistance in clamp 511.1 ω.
Resistance unaffected by magnetic lines passing thru film in any of the three directions.

The 3 minute films look to be nearly the same thickness.

July 25, 1907.

Resistance Measurements.

Contact Pressure 2450 grams.
Tube sparked free of O before starting the plating.

Platinum. 5 min Exp. #48.
Thick Plate 71.53 ω
Thin " 235.00

Platinum. 4 min Exp. # 49.
Thick Plate 261.4 ω
Thin " 1811.0

Platinum. 3 min Exp. # 50.
Thick Plate 197.1 ω
Thin " 350.2

Platinum. 2 min Exp. # 51.
Thick Plate 3588.0 ω
Thin " 51950.0

Platinum. 1 min Exp. # 52.
Thick Plate. Over 1000000
Thin " "

See note on next page over.

July 26, 1907.

Temperature-Resistance Curve.

Same apparatus that was used in making this test on the $3\frac{3}{4}$ in. Platinum film. (See under July 15.)
Temperature kept at each point 5 minutes before taking the resistance reading.

Gold. 30 min. Thick Plate. Exp. # 47.

TEMP. °C.	RESISTANCE
25.8°	.827
40	.852
60	.88
80	.91
100	.942
120	.96
140	1.00
160	.96
180.	1.75
x 200	Over 1000000
180	" "

On taking film plate out of contact clamps, found that the gold was completely removed at each end where the tinfoil made contact with it – this being the cause of the enormous rise in resistance.

No gold can be seen on the surface of the tinfoil, but it appears to have <u>alloyed</u> with the foil.

TEMP. °C.	RESISTANCE
160°	Over 1000000
140	" "
120	" "
100	" "
80	" "
60	" "
40	" "
21.5	" "

Increase in resistance for 100° rise in temperature (40°–140°) is .15 ω or 17.6 %.

This would make the temperature coefficient of gold .00176 per degree Centigrade.

Matthiessen gives it as .00365 per degree Centigrade.

Took plate out of contact clamps after this test and found that oil had gotten in between the silver and the foil.

The exposed part of the film between the contacts has changed color. It is now yellowish brown by transmitted light. By reflected light it looks white from the front side and blue from the back side. There is a sharp black line on the front of film where the edge of the foil came.

The ends of the film which were under the clamps have not changed color, i.e. – they are blue by transmitted light and white by reflected light.

July 29, 1907.

Temperature – Resistance Curve.

Temperature kept at each point five minutes before taking the reading.

Silver. 45 min. Exp. #28. Plate #1.

	TEMP. °C.	RESISTANCE.
	22.2°	1.594 ω
	40	1.61
	60	1.632
	80	1.66
	100	1.72
	120	1.84
	140	1.97
	160	2.05
	180	2.25
x	200	3.71
	180	4.47
	160	5.14
	140	6.04
	120	6.18
	23	6.14

July 30, 1907.

Temperature-Resistance Curve.

Temperature kept at each point five minutes.

Platinum. $3\frac{3}{4}$ ins.

Exp. #7. Plate #1.

TEMP. °C.	RESISTANCE.
24°	4.94 ω
40	4.96
60	5.05
80	5.17
100	5.36
120	5.51
140	5.75
160	5.62
180	5.24
x 200	5.28
160	5.10
100	4.85
60	4.70
33	4.60
22.2	4.56

Increase in resistance for 100° rise in temperature (40°–140°) is .423 ω or 9.14 o/o.

Temperature Coefficient would therefore be .000914 per degree C. – corresponding pretty closely to the value found on the first Platinum film on July 16th, which was .0008 per degree C.

These values are only about one third of the value usually given for Platinum wire.

July 31, 1907.

Temperature-Resistance Curve.

Platinum 3¾ hrs. Exp. #7. Plate #1.

Test repeated same as yesterday. Connections have not been disturbed.

TEMP. °C.	RESISTANCE.
25.3°	4.57 ω
40	4.627
60	4.703
80	4.79
100	4.876
120	4.96
140	5.05
160	5.12
180	5.16
x 200	5.20
180	5.11
160	→ Not Constant
140	5.04
120	4.96
100	4.88
80	4.80
41	4.73
22	4.595

Resistance Data on Some of the Metals. From Matthiesen and Others.

Ohms per Mil-Foot at 0°C.

Aluminum	17.4
Antimony	211
Bismuth	780
Cadmium	60
Cobalt	
Copper	9.5
Gold	12.3
Iron	54.5
Lead	117.
Magnesium	26.2
Mercury	566.
Nickel	74.4
Palladium	61.1
Platinum	54
Silver	8.94
Thallium	106
Tin	78.5
Titanium	
Tungsten	
Zinc	34.8

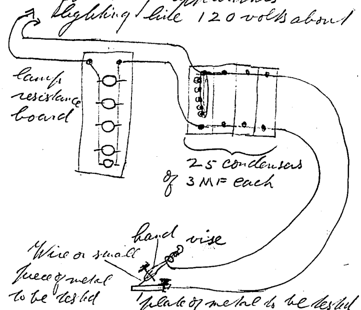
Notebook, N-07-06-18

Experiments on the Scintillations of the different metals under the electric spark.

June 18. 1907

A Mc Glaister

To cause the sensations use the following apparatus



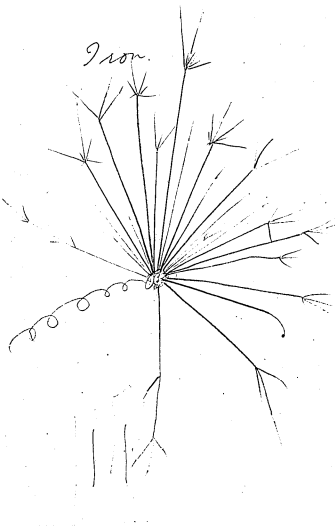
Used 1 16 candle power lamp on the board & 25 condensers of 3 MF each making 75 MF in all

Iron

used a piece of clean sheet iron & a piece of fine iron-wire. With this metal the blue spark round the terminals is comparatively small.
The scintillations are long almost all straight till near the end where they fork and the straight portion is a bright white or slightly yellow colour the side branches that fork off are red & quickly become dull red they are generally straight & in some cases show dark spaces, some of the scintillations do not show forks & in this case they almost always show a dark space near the tip.
Where the surface of the metal is clean the scintillations are less in number & shorter than where there is a slight film of oxide and with the clean metal the terminals show a great tendency to weld. there is absolutely no smoke with these scintillations ×

× When I threw the arc light on the terminals I could see a haze of smoke but much less than with Cu or Mn.
The scintillations show no elevation with a strong magnet

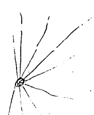
Iron.



with clean surfaces the scintillations would average two or three inches but where there was a film of oxide they would be thrown out as far as 12 inches or more
Now & then an exceptionally large scintillation would end in a little bead of metal
~~In no case did I find any scintillations that forked from more than one point~~, the end of the main scintillation was just as thick & bright as the beginning but it did not show any tendency to beading
~~Tried cast iron & tool steel but did not find any appreciable difference~~
~~also~~ noticed the spark from iron on an emery wheel & found it to have the same general character the only difference being that most of the sparks were brighter at the end than at the beginning in some cases they were brighter after the fork than before.
Now & then Iron throws off a spiral but it is only very seldom, the spiral is much coarser & more decided than [illegible]

Chromium,

In hydrogen could not be distinguished from iron shows no forks but distinct dark spaces



The scintilations show no deviation with a strong magnet

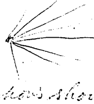
Chromium.

Used pure fused chromium.
The scintilations from this metal bear some resemblance to those from iron but there are some marked features of difference.
The scintilations begin straight as with iron and at a certain point they branch out forming more branches than with iron & the end of the straight part is generally thickened or even ~~beaded~~ beaded
The main branches at the point of forking show a tendency to leave the first straight line at a higher angle than in the case of iron
This metal gives a slight amount of smoke in thin curling lines & these are light up from the blue light of the spark & look almost like a brush discharge
I could never observe this effect on the first discharge so it was probably the spark lighting up the smoke from a previous discharge

Occasionally a very large spark
would show signs of re branching
on one of the large branches.
Some of the bigest sparks did not seem
connected with the blue arc but
would be thrown out say half an
inch before they would show as
a white line.
Most of the fine branches showed
slight dark spaces at the tip then
a brighter piece than before like a
little wedge
In colour & intensity the Cr cannot
be distinguished from Fe the principal
difference is in the formation of a
bead at the point where the main
line branches & in the larger number
& more obtuse angle of the branches.
The clean terminals of chromium
show some tendancy to weld
but not as much as those of
iron.

Manganese

In hydrogen no trace of revolution visible no ~~[illegible]~~ forks no black spaces dull red could not be distinguished from carbon



The scintillations show no deviation with a strong magnet.

Manganese

The scintillations from this metal are like those of iron in colour & intensity but they differ in that they are almost all curved & twisted & the particles thrown off seem to be larger & can be seen to be revolving there is considerable smoke which forms long spiral lines owing to the revolving particles most of the scintillations are forked but not nearly so much so as chromium, owing to the crumbly nature of the metal the spark loosens little fragments which are scattered all round most of the bigger scintillations do not show luminous till a little way from the ~~face of metal~~ metal terminal Sometimes quite large particles are thrown off which show up as a revolving ball of fire & remain luminous till they strike the desk the scintillations that fork are branched like those of chromium but they do not form as many branches
Many of the scintillations go almost

straight & appear very faint then they take a sudden bend to become much brighter
There are quite a number of the smaller ones which do not branch but end off with a slight bend then a dark space & a little red tip.
Some may be seen at first as a thin straight line then they get thicker & show signs of revolving.
The number of curved scintillations & the appearance of revolving particles at once distinguishes manganese from either iron or chromium
The terminals with him do not weld but on the other hand they crumble away.
The difference between the scintillations of this metal in air & in hydrogen is most striking in the latter there is no trace of the appearance of revolving no branches & the light is very dull red no dark spaces visible The hydrogen does not prevent the smoke formation

Aluminium (Al 1)

This metal shows two distinct kinds of scintillations
I large brilliant blue lines which begin straight then suddenly burst back on themselves & change to thin curved & twisted lines of dull red
II small scintillations which are thrown out as red lines from the first and are very dull in colour compared to the others.
The larger scintillations show great variety in the way they finish. The greater number burst upon themselves & become red & very crooked but remain as a single line without forking. Others show two or three distinct branches at the point ~~of~~ where the blue turns into red while here & there one may be seen to throw off branches while it is still coloured blue.
Most of the larger blue scintillations show signs of revolving.
This metal shows some smoke but very little hardly enough to be noticeable without the arc light

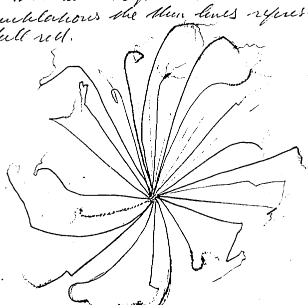
Aluminium in hydrogen

all straight lines no branches
dull red no trace of the
blue scintillations which are shown
no dark spaces visible

Al$_3$

In some cases the beaded appearance
due to revolution shows only in the
small red forks but does not show
in the blue line at all
Sometimes with the more prominent
scintillations the point where
the blue changes to red seems to
be surrounded with a red light like
a pale flame.
When the al is used as laminae
in the black discs for photography
the Al_2O_3 formed seems to be
attracted by the static charge
in the discs & bridges across the
gap in fine threads
Most of the largest scintillations of
aluminium seem to be enveloped
with a sort of flame which gives
off so much light that it hides
much of the detail at the end
of the scintillation
The spark at the point of contact
is large & bright blue in colour.

Aluminum
The thick lines represent the blue scintillations the thin lines represent dull red.

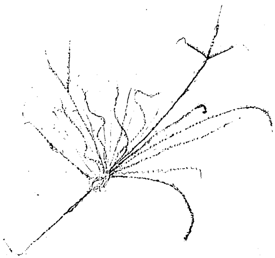


The shading on some of the large scintillations is meant to represent an envelope of flame which hides a good deal of the fine details at the tip of the scintillations

~~without the arc light.~~ Al_2

The terminals have considerable tendancy to ~~stu~~ weld when they are clean.
When the terminals used are clean there is not much blue spark and there are comparatively few of the red scintillations when the terminals are dirty there is a large blue spark & a great many dull red scintillations with just a few blue but these blue ones are very large & brilliant
The greater part of the large blue scintillations are straight at first & many turn red at the point before they commence to burst while others burst while still blue then fade into red
Many show some forks after they turn red & a few show quite an explosive head like Cr.
Some of the scintillations have a beaded appearance the whole length of the blue due to revolving others show continuous till near the end then show the revolving just at the termination

Magnesium



In hydrogen
Gives very few scintillations
but what few it gives are quite
straight & dull red there is
distinct smoke formation

What scintillations there are are
very short

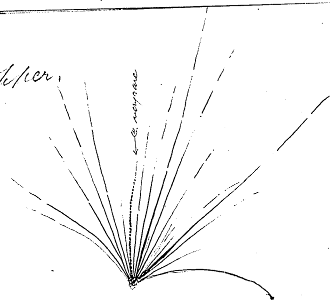
Magnesium.

The scintillations of this metal
are very similar to those of aluminium
the principal features of difference
being that they show much more
of the beaded & spiral appearance
due to revolving and they have
more tendency to curve & twist.
Like aluminium the principal
scintillation is blue & at the
end changes to red but both the
blue & the red portions show
revolving.
Like Al most of the large scintillations
show an envelope of flame which
tends to hide the fine detail
Also like Al the oxide formed when
the two terminals are between the
black discs, is attracted by the
static charges forms threads across
the gap.
The spark at the point of contact of
the terminals is bluish green in colour
Even with clean metal the terminals
show very little tendency to weld
when held between the brass springs

they may be pressed together &
will give a small arc for some
time without any tendency to stick
the Mg scintillations show much
more tendency to fork than those
of Al. some seem to come to an
explosive head like tin.
If a number of sparks were made
in quick succession among the smoke
could be seen little silvery particles
of metal ~~blast~~ lighted up from the
flash of the following spark.
Magnesium seems to crumble under
the spark but nothing like the
same extent as tin there are
small fragments all scattered
over the bench but they are
much smaller than those from tin
this metal seems to show even
greater variety than aluminium
some of the scintillations are very
much twisted & others are straight
& thick some show much forking
& even an explosive head while
others do not fork at all but all
even the finest red ones show some signs
of spiral revolution.

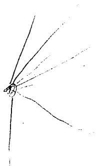
The photographs showed quite frequently a tracing that started thick then came to a shoulder & continued thinner having an appearance like the tracing on a phonograph record.

Copper.



In hydrogen showed almost the same the colour a darker red Sometimes the spark was surrounded with a scarlet envelope as with [illegible]

but saw this in air also so it is not connected with the hydrogen



Copper.

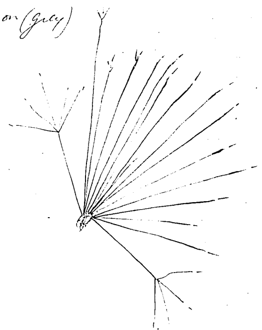
The scintillations of this metal are quite different to any of the previous ones.

The spark at the point of contact is small and bluish green in colour

The scintillations are a dull red colour & very long at times, when the spark is made between two points they may fly out two feet, the scintillations are all straight are only very slightly curved like a paraboloid and they show no forks they start thick and gradually become thinner till they are quite fine then there is a very distinct dark space sometimes $\frac{1}{4}$ of an inch long then the light began again & might be quite thick at the base & dwindle down again to form another dark space & a second or even a third bright tip

The Mn terminals show
some tendency to weld but
not as much as Fe
There is some smoke formed
but not enough to be very
noticeable except in a ray
of arc light the smoke does ~~not form~~ ~~[illegible]~~
The ~~[illegible]~~ scintillations are
thrown off in a more distinctly
radial direction than with
some of the other metals there
is very little tendency for them
to cross one anothers paths
Occasionally there is a scintillation
which shows a beaded appearance
throughout its whole length
but these are comparatively rare
Tried several photographs but
could not get anything that
showed the characteristics as
the copper scintillations are
such a dark red colour
Copper in oxygen is just the
same as in air ~~[illegible]~~ except
that it is a mere trace brighter
but in shape & character it
is just the same

Cast Iron (Grey)



In hydrogen

Very dull red no dark sparks visible. no branching visible

Further work on Iron

Did some further work on Fe to see the difference between cast & wrought iron & different forms of steel Also tried to deflect the scintillations of Fe with a powerful electro magnet but found it had absolutely no effect.

There is a distinct difference between cast iron, wrought iron, & tool steel but could not notice any appreciable difference between wrought iron & machine steel

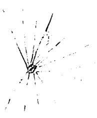
Grey cast iron

The noticeable feature about cast iron is the very small proportion of scintillations that fork. Most of the scintillations thicken a little at the ends & then have a dark spark & a very small dash on the tip

Wrought Iron

In hydrogen.

Dull red no branching visible but dark spaces very noticeable



when there is a forked one the forks are usually very large & spread out irregularly after the fashion of a fan

Wrought Iron
This differs from cast iron in the greater number of scintillations which show forks

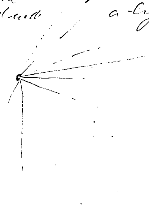
Machine steel.
Could not notice any difference between machine steel & wrought iron.

Tool Steel ~~[illegible]~~ (rod)
The difference between wrought iron & untempered tool steel were only very slight the forks of the scintillations were slightly more inclined to be feathery

Steel from file
This was more distinctly feathery at the end of the scintillations than the piece of rod tool steel.

Steel from file

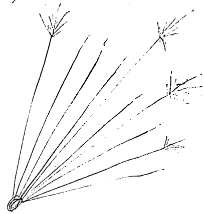
In hydrogen no branches visible dark spaces quite distinct sometimes the blue spark is surrounded with a bright red envelope



each scintillation had more small branches at the end than was the case with wrought iron

Effect of tempering
Broke a file into 6 pieces heated two red hot & plunged into water = glass hardened
heated two more pieces & allowed to cool slowly = drawn
left the other two pieces as they were.
cleaned up the surfaces on an emery wheel & tried the difference in the scintillations but could not detect any difference in the character the two pieces that were drawn showed the most tendency to ~~split~~ weld and the scintillations were not quite as long as with the others.
The scintillations from the file steel are much more stellar than are those of wrought iron

Self hardening steel



Self hardening steel

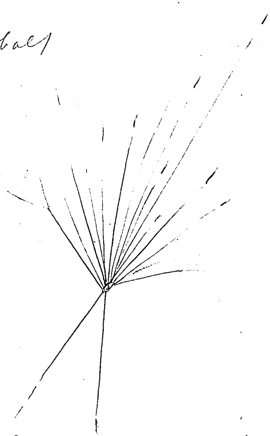
The scintillations of this are of two kinds some without any forks like the predominating ones in cast iron & others that have many branches & are feathery like the file

Effect of an atmosphere of hydrogen.

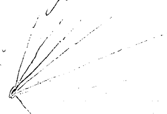
I Had a wooden box made with 2 glass sides that the discs containing the metal terminals in this I passed dry hydrogen in at the top & out at the bottom into an inverted test tube to prevent diffusion made the spark by means of a stick going through the box & connected with one of the springs carrying the disc. I found that the hydrogen made an enormous difference tried wrought iron first instead of being bright yellow the scintillations were only a very dull red & showed absolutely no forks but were only short lines with a number of dark spaces looking like a discharge of small condenser through

cofeser.

Cobalt



In hydrogen looked just like copper does in air showed no forks dark spaces gleam dull red



Cobalt

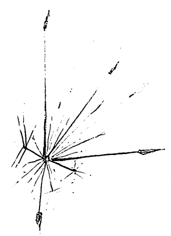
The scintillations of cobalt bear considerable resemblance to those of cast iron but in the case of cobalt there are even fewer forked scintillations. The most characteristic scintillation showed one straight scintillation which gradually became thinner then there was a very short dark space & a dash added on at the tip that was as thick or thicker than the first part of the scintillation. Then there were others which showed several ~~scintillation~~ dark spaces & the ~~little~~ dashes were not as thick. The scintillations of this class were almost exactly like those of copper except for a difference in colour they were not quite so dark a red. Then again there were some scintillations which showed forks but the forks were different from those of iron the branches

did not as a rule fly out at such a wide angle & the forks were usually as thick as the straight line they came from but were not so bright in colour these branched scintillations were comparatively rare

there was very little smoke with the exhaust spark less if anything than with iron some of the scintillations showed a very slight signs of revolving the spindle was very close & needed much looking for to observe it at all.

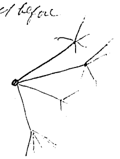
Cobalt shows the strongest tendency to weld of any metal tried yet, between clean terminals the spark makes them stick so that it is quite difficult to pull them apart

Iron in Oxygen (Wrought Iron)



File steel in oxygen ×

× Tried this again but found [illegible] on branches next time must have been some air left before



The forked scintillations were longer than with soft iron

Iron in Oxygen. (Wrought Iron)

In oxygen the characteristics of the scintillations of wrought iron are altogether altered they are brighter but shorter & show very much less tendancy to fork on the other hand most of them end with a little dash thicker & brighter than the rest of the scintillation & this dash often has jagged edges looking like the head of a savages spear those scintillations that do fork which are generally very short & bright and end slightly explosive with a bead like chromium in air.

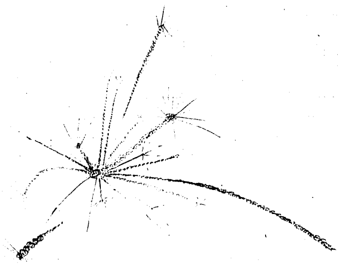
The scintillations tipped with the rugged dash are generally very thick. some of the branches of the scintillations show a slight tendancy towards being spiral

There was slight evidance of smoke formation

Steel in oxygen (File Steel)

This showed more tendancy to fork the forks were very slight there was not much evidance of the dagger ends like soft iron showed.

Mn in O.



distinguished from Cr.

Chromium in Oxygen

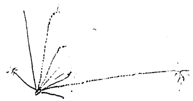
The character of the scintillations is not much altered by oxygen they show brighter & perhaps a rather larger proportion do not fork but the greater number show an explosive head & fork just as they do in air.

Manganese in Oxygen.

The oxygen makes a wonderful difference in the scintillations of Mn. they are very bright and thick and though still spirals do not show as much tendency for irregular twisting as in air and at the tip they have a regular fan of fine branches some of these thick scintillations show no connection with the terminals at all but begin thin & gradually get thicker till they burst. The main scintillation is a vivid white & the star of branches a fairly bright red while some of the scintillations show the spiral very well others look quite straight & could not be

Al in 6

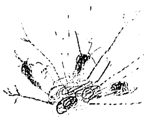
Colour a very bright blue with red points at the tips.



Aluminium in 6.

This metal burns so quickly in 6 that most of the scintillations are much shorter than in air they are all much brighter & of a more decided blue colour. There is very little tendency to double back on themselves & form hooks as in air on the other hand many of the large scintillations seem to explode & branch at the point as they hardly ever do in air. The tendency to form spirals is more marked than in air. There are practically no red scintillations all are blue but the tips & branches are still red. These scintillations in 6 look more like Mg in air. Quite a number of the scintillations end off without any change simply a blunt end to the straight blue scintillation. The spiral tendency & formation of explosive point are neither as marked as with Mn but are much more noticeable than with Al in air

Mg in O



Magnesium in O.

It is difficult to get any large scintillations of mg in O it burns so readily that one only gets a brilliant flame round the terminals this flame illuminates the smoke so strongly that it shows up in the photographs but sometimes very large scintillations can be obtained as a sort of irregular continuation of the ovoid flame round the terminals, and occasionally there would be thin scintillations showing the characteristic spiral ascen in air but they would all be straight not twisted all ways as in air. Sometimes there would be a thin bright line with three or four thicker brighter patches on it like beads. I had one night often make 8 or 9 sparks before getting any scintillations at all

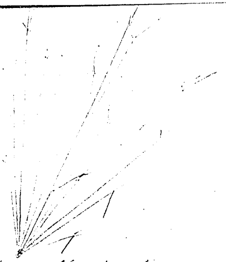
In Air & Oxygen

Tried Fe Al & Mg in a mixture
of about 2 parts air & 1 part O
The Fe gave all the characteristics
of pure O except that the scintillations
were not quite so bright & a little longer

Al gave characteristics intermediate
between those of air & pure O the
scintillations were longer than in
O & brighter than in O air they
were in a good condition to photograph
the ends of the scintillation in some
cases finished off just as in air &
in other cases showed an explosive tip
as in O there was more tendency to
form spirals than in air

Mg also gave characteristics intermediate
between air & O the large irregular
blue flame was there but was
smaller than in O & there was
a larger proportion of the typical
twisted spiral scintillations

Fe in Cl.

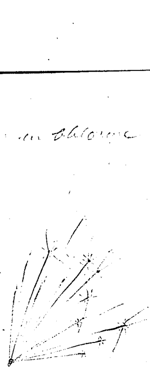


Colour a dull yellowish red.
characteristics almost the same
as in air.

Fe in Chlorine

Filled ~~with~~ the sparking box
with dry Cl_2 (generated from HCl
& $KMnO_4$ the gas must be dry or
it very soon obscures the glass)
& made the scintillations of Fe
in this gas the scintillations were
both very numerous & very long
and it was much easier to get
a big spark than in air
They were not quite so bright as in
air & the colour of the Cl cut
off some actinic light but had
no difficulty in getting photographs
The characteristic forking was
just the same as in air & the
photographs could not be distinguished
from those made in air the principal
difference lay in the clouds of
smoke that each spark made
after 5 or 6 sparks the glass
began to get obscured too much
to photograph more

Chromium in Chlorine



Rather longer than in air
colour dull yellowish red

Chromium in Chlorine.

The scintillations of chromium in chlorine are very numerous & long as is the case with iron in fact you can get a big splash of sparks in chlorine every time while in air sometimes the scintillations are almost absent. The chlorine scintillations are dull red & longer on the whole than in air but the general characteristics are the same as in air the tip of the scintillation ends in an explosion and throws out branches exactly as it does in air, the scintillations were too dull to get good photos. As with iron so with chromium in chlorine dense clouds of smoke are given off from the spark

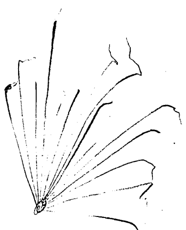
Mn in Chlorine

Colour & general characteristics very similar to chromium in Cl

Manganese in Chlorine.

The scintillations of manganese in chlorine are quite different in character from those in air they more nearly resemble chromium. In colour & brightness they are about the same as iron & chromium in chlorine and they seem to have lost mostly their tendency to burst & form spirals the larger scintillations have slight curves but the sharp bursts that are found in air are almost entirely absent the scintillations grow brighter the further away they get from the spark ~~&~~ quite a number of them show no attachment to the central spark at all after careful looking could not see any spirals at all some of the scintillations have a slightly wavy outline but a large proportion of them are quite straight it would be difficult to distinguish with certainty between this metal & Cr in Cl.

Al in Cl



Colour red rather brighter than Fe in Cl. Shape about the same as Al in air.

Aluminium in Chlorine.

In making the scintillations of Al in chlorine one sees at once the great difference that instead of being intensely bright ~~[illegible]~~ blue as in air they are ~~[illegible]~~ red in colour. In size & shape they are about the same as in air.
The scintillations make some smoke but not nearly as much as Fe or Cu.
As in air there are no branches visible or at any rate only very minute ones.
Could not detect any indication of spiral formation.

Mg in Cl

Below very slightly blue very bright blue flame round the terminals which illuminates the dense smoke with a blue light

Magnesium in Chlorine

The effect of chlorine on the scintillations is most curious the scintillations in the form of a continuous twisted line as seen in air are very rare & the main number seem to have the dark spaces in the scattered scintillation so enlarged by the chlorine that they no longer appear as a line but as one or in some cases two or three luminous dots. these dots are slightly blue in colour but not nearly so blue or so bright as in air there is a bright blue spark at the terminals & a very dense cloud of smoke formed and among this smoke are scattered all over little detached dots of blue light the flame like spark round the terminals was similar to the one formed in O

the few line scintillations that are formed are similar to those in air.

Titanium

Some of the scintillations have hardly any tail at all just an explosive head

Titanium

This element was used in the form of a fine powder as we had no pure titanium in pieces the powder was spread over a sheet of zinc & the spark obtained by using a strip of zinc as the other terminal. Zinc was chosen because it gives practically no spark.

The scintillations from this element are very similar to those of chromium the colour is if anything a little brighter and they show more tendency to an explosive fire ball like head. Quite a large number of the scintillations show no connection with the point of contact on the zinc plate they may travel for about 2" before they become visible then they begin as a fine dull red line constantly thickening & getting brighter till they burst. There seemed to be no appreciable smoke, I never was never able to observe a dark space followed by a light dash as seen in Cr. or Fe

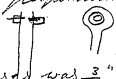
[THIS BOOK WAS USED IN BOTH DIRECTIONS. THE FOLLOWING PAGES WERE FILMED FROM THE BACK END FORWARD.]

Methods used to photograph the scintillations.
Tried first with Fe
No 1 took 1 discharge about 2 feet from lens at F11 very little picked up at this stop
Tried again at full opening & about 18" away this showed much more exposure but very little depth of focus being so near at that large stop
found the best way to focus was to use a candle flame just in front of the Fe plate & focus from 1/2" to 3/4" forward the distance which gave about the best compromise was about 20"–23"
Took Fe, Cu, & Mn, under these conditions.
Took Fe & then Al with the reflex at 1/500 of a sec very little showed with Fe but with the Al got some tracings about 1" long

Speed of fan motor
no load on

I	notch on resistance about	1800
II	—	2200
III		3100

Fit up some brass shells on springs to cut out the spark & those of the scintillations going much out of perpendicular the diam of



the discs was $\frac{3}{4}$" & at the time of spark they were about $\frac{1}{8}$" apart used the front bellows of the camera fully extended & focused by moving the whole camera the distance from the terminals to the front lens was about 16" this gave a picture about natural size later on got new 4x5 camera & 7" helior lens set this at the position to give a picture just natural size
later on had to try the scintillations in different gases for this enclosed the discs in a box with glass windows with gas inlet & outlet tubes & a stick arrainged to touch the terminals together

Method of making Plates
Red Sensative
By Arthur Payne
Photo Era

Bathe the plates for 3 minutes in a solution of
Pinacyanol 1 in 1000 alcohol) 2 cc
Dist H_2O 100 cc
This should not be used more than once
Wash the plates for 3 minutes wipe with pad of cotton & dry.

Green safe light for use with above plates
The following solution used in a cell 1" thick.

Acid green	2 parts	Dilute with
Naphthol green	2 parts	25 parts
Tartrazin	15 parts	of H_2O
Dist water	300 parts	

Use a sheet of ground glass in front of the cell

Pinacyanol (1 in 1000 alcohol) 2 cc
Dist. water 100 cc

Do not use more than once

Green Safe Light

Acid green	2 parts
Naphthol green	2 parts
Tartrazine	15 parts
Water dist.	300 parts

Dilute this stock solution with 25 parts of H_2O and use in a cell 1" thick.

In case of necessity the plates do not need to be dried but may be loaded into the plate holder after being wiped off with cotton. After exposure they should be soaked about 10 minutes in dist. water to make evenly wet before development.

Even with the safe light mentioned do not expose the plates to light more than is absolutely necessary.

Notebook, N-07-08-12

07-08-12

Salv. # 1953.

"Edison Effect."

Definition.

Phenomenon of flow of current observed in an ordinary incandescent lamp when a third electrode, which has been sealed in the lamp, is connected to the positive leading-in wire of lamp.

In the following experiments the effect will be observed by means of a D'Arsonval galvanometer reflecting a beam of light onto a straight scale at a distance of 53 inches.

August 13, 1907.

Lamp #1.

Lamp is marked for 116 V. At this voltage it takes 570 milamperes and therefore consumes .570 X 116 = 66 Watts

Assuming an efficiency of 3.4 watts per C.P. the lamp is found to have approximately 19 Candle-Power.

Filament makes only one loop and a platinum wire is sealed in between the filament terminals. This third electrode extends into the vacuum about $1\frac{1}{2}$ inches.

Took off readings with gal. connected between Pt and positive

82.9	V. at Lamp.	.369	Amps.	2	mm. Def.
89.3	"	.409	"	7	"
93.2	"	.431	"	15	"
95.1	"	.443	"	21	"
100.2	"	.474	"	48	"
103.1	"	.492	"	76	"
109.6	"	.532	"	190	"
112.7	"	.550	"	272	"

I notice that the current thru the vacuum, from the third electrode to the negative, does not appear immediately upon closing the lamp circuit but comes about one second later. This is not due to inertia in the galvanometer as this instrument will respond immediately to the slightest impulses.

August 14, 1907.

Lamp #1.

Carbon Filament. 116 V.

Gal. between third electrode and positive.

$\frac{1}{9}$ and $\frac{1}{99}$ Gal. shunt coils in ||.

Volts.	Amps.	MM. Def.	
84.7	.378	1.5	Test #2.
95.1	.440	7	
101.9	.481	18.5	
107.5	.516	41	
110.5	.535	59	
117	.579	121	
120.5	.600	157	
128	.650	312	
131.2	.470	367	
142.2	.742	620	

Gal. between third electrode and negative, and shunted as before —

142.2	.742	10	

8/14/07.

Lamp #1.

Carbon Filament. 116V.

A 150 volt Weston Voltmeter used as Gal. - Connected between third electrode and positive.

VOLTS	AMPS.	DEF.	
92.2	422	.1	Test #3.
112.5	549	1.1	
126.2	639	4	
140	728	8.9	
132.7	677	6	
146.2	770	10.3	

Lamp was allowed to cool off and test was then repeated -.

96.8	452	.1	Test #4.
112.2	550	.9	
119.2	593	1.8	
122.2	613	2.2	
131.2	672	4.8	
133.9	690	5.9	
145	767	9.3	
148	785	1.0	

(See Over.)

August 15, 1907.

Lamp # 1.

Carbon Filament. 116 V.

Observations made with a Weston 150 V. Voltmeter, connected between third electrode and positive.

This is a repetition of last night's tests on the same lamp.

Volts	Amps.	Def.	
95.8	442	.1	Test # 5
110	532	.6	
119	589	1.6	
126.7	640	3.1	
130.6	664	4.3	
141.5	737	8.5	
148	780	9.9	

8/15/07.

Lamp #1.

Carbon Filament. 116 V.

D'Arsonval Gal. between third electrode and positive.

Gal. shunted with the $\frac{1}{9}$ and $\frac{1}{99}$ coils in parallel.

Volts.	Amps.	MM Def.	
87.6	395	1.5	Test #6.
95.1	440	5	
99.8	467	9	
103.3	491	1.6	
109	527	35	
113.2	553	57	
120	597	120	
123.4	620	155	
127	641	220	
131.8	674	315	
136	701	406	
138.3	719	447	
140	729	500	
145	760	585	

Gal between 3rd electrode and negative –

146	770	20

8/15/07.

Lamp #2.

Carbon Filament. 113½ V.

Takes .576 amps at rated voltage

113.5 x .576 = 65.37 watts.

Gal. between 3rd electrode and positive

$\frac{1}{9}$ and $\frac{1}{99}$ shunt coils in ||.

Volts	Amps.	MM Def.	
85.3	397	1.5	Test #1.
91.8	434	5	
97.8	472	13	
103	509	30	
111	560	88	
114.1	581	130	
122	633	293	
126	663	412	
134.7	718	636	

Gal. between 3rd electrode and negative

134.7	.718	0

8/15/07.

Lamp #2.
Carbon Filament. 113½ V.
Galvanometer between third electrode and positive.
$\frac{1}{9}$ and $\frac{1}{99}$ Gal. shunt coils in ǁ.
Repetition of Test #1.

Volts	Amps	MM Def.	
91.9	.437	4	Test #2.
96.8	.467	10	
100.4	.491	18.	
103	.508	26	
108	.540	53	
112.2	.569	90	
117.7	.602	166	
119.3	.618	203	
122.5	.638	265	
130.7	.693	492	
135	.722	605	

Gal. between 3rd electrode + negative.

135	.722	3	

8/15/07.

Lamp #2.
Carbon Filament. 113½ V.
150 V. Weston Voltmeter between
third electrode and positive.

Volts	Amps.	Def.	
89.9	423	+	Test #3.
100	490	.2	
108.8	543	.8	
112.2	569	1.2	
119.3	617	3	
122.2	636	3.9	
131	697	7.2	
134	713	8.8	
136.7	732	10.1	
138.2	748	11	
145	793	13.2	

8/15/07.

Samp #2.
Carbon Filament. 113½ V.
150 V. Weston Voltmeter between
third electrode and positive.
Repetition of Test #3.

VOLTS.	AMPS.	DEF.	
92.8	441	+	Test #4.
98.7	480	.1	
110.7	557	1.	
114.2	583	1.5	
119.8	619	3	
124.3	650	4.2	
128.7	680	6.	
131.3	699	7.1	
134.6	719	8.9	
142.2	770	12.1	
145.2	795	12.8	

The amount of current which flows thru the vacuum is very small. — If a 500 milampere meter be substituted for the galvanometer, it will not be deflected appreciably with the lamp burning at 150 volts. This means that the current is less than .001 amps.

T.A.E. says that he has gotten enough current in this way to operate an ordinary telegraph sounder.

I am of the opinion that this large flow of current was due to residual mercury vapor in the lamps, as they were exhausted in the old way by means of Sprengel's pumps.

The present lamps under test were not exhausted on mercury pumps.

August 14, 1907.

Lamp #2.

Carbon Filiament. $113\frac{1}{2}$ V.

Galvanometer between third electrode and positive.

$\frac{1}{9}$ and $\frac{1}{99}$ shunt coils in ||.

Second Repetition of Test #1.

VOLTS.	AMPS.	MM DEF.	
89.8	.421	2	Test #5.
94.	.450	4	
101.	.497	14	
106.7	.532	30	
110.3	.557	50	
113.9	.579	80	
119	.617	141	
124.2	.651	232	
133.2	.711	470	
136	.732	538	
142.7	.780	610	

Gal. between 3rd electrode + negative –

142.7	.780	18

The third electrode in this lamp is not all platinum. It is platinum for a short distance at the base but consists mostly of a black substance resembling carbon filament which is cemented onto the platinum.

8/16/07.

Lamp #3.

Tungsten Filament.

Lamp is not marked but seems to be about the right brilliancy at 10 volts. It takes about 5.1 amperes at this P.D.

Galvanometer connected between third electrode and positive and is not shunted.

Current readings could not be taken accurately because meter was calibrated for 100 amps.

Volts.	Amps.	MM Def.	
4.01	3	.5	Test #1.
5.12	3.4	1	
6.4	4	5.5	
7.43	4.3	26	
8.08	4.6	45	
8.75	4.9	69	
9.27	5	85	
10.14	5.2	114	
11.2	5.6	148	
13.07	6.1	221	
13.62	6.3	240	
14.75	6.6	280	
"	"	0	– Gal. bet. 3rd + neg. electrode

The galvanometer has been moved since the last test and when setting up again I changed the distance from the galvanometer mirror to the scale. Before it was 53 in. and now it is 48 in. The change was made so as to get a sharper image of the beam of light.

September 11, 1907.

Tungsten Filament, Samp #3.
Galvanometer connected between third electrode and positive and is not shunted.
Have no suitable meter for taking current readings.

Volts	MM. Def.	= Amps. x 10^7	Test #2.
6.30	.5	1	
6.88	10.5	20	
7.61	27	52	
8.30	44	85	
9.00	62.5	121	
9.70	79	152	
10.4	95.5	184	
11.1	112	216	
12	133	257	
13	161	311	
13.98	197	380	
15	249	480	

Gal. between 3rd electrode and negative –

15	0.

September 12, 1907.

Calibration of Galvanometer

Resistance of Gal. = 252 ω.
Shunted it with 1 ω. and connected in series with a 500 milampere meter.
Readings as follows –

.005	amps.	=	107	mm. def.
.010	"	=	214	"
.015	"	=	315	"
.020	"	=	405	"
.025	"	=	516	"
.030	"	=	603	"

Deflection of Gal. is practically proportional to the current.
The average deflection taken from the above straight line curve is 102 mm. for .005 amps.
Therefore if gal. is not shunted it will be deflected 102 mm. by $\frac{.005}{253}$ = .0000197 amps.
One millimeter of the scale will then represent .000000193 amps.

(over)

This "Electric Mfg. Co." shunt is the one used in all tests to date.

$\frac{1}{9}$ and $\frac{1}{99}$ coils in ‖ = 7.4 ω, Constant 4.405

$\frac{1}{9}$ and $\frac{1}{99}$ coils in ‖ = 60.94 ω, Constant 4.135

9/12/07.

When shunts are used with the galvanometer, this value must be multiplied by a constant found by the following formula:–

$$\frac{\text{Gal. R}}{\text{Shunt R}} + 1 = \text{Constant.}$$

The Resistance and Constants for the various shunts we have are as follows:–

Shunt marked "Electric Mfg. Co. Troy, N.Y."

Plug in	$\frac{1}{9}$ = 887 ω,	Constant	= 1.284
" "	$\frac{1}{99}$ = 80.8 " ,	"	= 4.118
" "	$\frac{1}{999}$ = 8.05 " ,	"	= 32.3

"Elliot Bros, London."

Plug in	$\frac{1}{9}$ = 729 ω,	Constant	= 1.345
" "	$\frac{1}{99}$ = 66.5 " ,	"	= 4.989
" "	$\frac{1}{999}$ = 6.55 " ,	"	= 39.47

"J. Carpenter, Paris."

Plug in $\frac{1}{9}$ = 75.6 ω

" " $\frac{1}{99}$ = 7.33 "

September 13, 1907.

Samp. #1. Carbon.
Gal. between 3rd and positive.
Shunted with 60.94 ω.

Test #7.

Volts	Amps.	MM. Def.	= Amps. x 10^6
94	.438	5	4
100.7	.480	14	11
106.9	.519	34	27
111.7	.547	63	50
115.8	.572	101	81
121.9	.611	185	148
125.1	.633	263	210
128.2	.653	326	260
132.2	.681	412	329
134	.691	461	370
136.9	.711	525	419
139	.727	584	466
142	.749	630	503

Vacuum here was about 29.9 inches of mercury.

September 14, 1907.

Lamp #1. Carbon.

After admitting air and then reexhausting as high as possible on a mercury pump.

Gal. between 3rd electrode + positive

Test #8.

First tried lamp at 130 V. with different shunts on galvanometer to find which one was suitable.

At this P.D., with a 6.55 ω shunt, gal. was deflected 630 mm. This is equivalent to .00479 amps.

Then after a few minutes tried lamp at 140 V. using a 3.61 ω shunt and deflection was only about 100 mm. which is equivalent to .00137 amps. The current was very unsteady and galvanometer kept oscillating rapidly.

Now tried with 6.55 ω shunt again, at 140 V. Deflection was about 150 mm. (=.00114 amps).

but at intervals of about two seconds, galvanometer would suddenly swing up off the scale momentarily and then drop back to 150 mm. These oscillations could also be observed in the milammeter - it being in series with both the main current which was lighting the lamp and the shunted "Edison Effect" current - and when the galvanometer connection between the 3rd electrode and positive was broken they disappeared, showing that the vacuum current was the cause of the oscillations rather than variations in the voltage of the line.

On opening the circuit for a short time and then closing again the oscillations would some-

times disappear and after a while the deflection, at 140 V. across the lamps, became quite constant.

Galvanometer was then connected with a 36.47 ω shunt and the following readings taken:–

Volts.	Amps.	MM Def. =	Amps. X 10^6
100.2	.472	11	17
108	.520	32	49
114	.559	75	114
120.5	.601	156	237
125	.630	228	346
131	.670	325	494
134.5	.694	398	605
139.2	.728	510	775
142	.746	648	985

Gal. between 3^{rd} and negative.

142	.746	0	

Vacuum here was about 29.9 inches of mercury.

September 16, 1907.

Lamp #3. Tungsten.
After admitting air and then reexhausting to as high vacuum as possible on a mercury pump.
Gal. between 3rd electrode and positive - not shunted.

Volts.	MM Def. =	Amps x 10⁷	Test #3.
6.5	5.5	11	
7.5	21	40	
8.5	40	77	
9.3	56	108	
10.1	72	139	
10.9	89	172	
11.7	105	202	
12.5	123	237	
13	134	258	
13.5	148	285	
14	161	311	
14.5	176	339	
15	190	367	

Was carrying lamps out of room, holding it gently in my hand, when suddenly it explod

September 17, 1907.

Lamp #1. Carbon 116 V.
Reexhausted a second time on the mercury pump to 28 in. vacuum.
Gal. between 3rd electrode and positive.
Shunt = 887 w.

Test #9.

At 145.2 V. lamp took .502 amps. and gal. was deflected 150 mm. which is equivalent to 37 X 10⁻⁶ amps.
Lamp was kept burning at this voltage and deflection of gal. kept diminishing. After 3 minutes lamp at 145 V. took .472 amps. and gal. was deflected 80 mm = 20 X 10⁻⁶ amps.
Vacuum is too low. Lamp bulb gets very hot and filament is only at bright red at 145 volts where it should be white.

September 17, 1907.

Samp #2. Carbon - 113 ½ V.
Galvanometer between third electrode and positive.
Shunt = 36.47 ω.

Volts	Amps.	MM. Def.	= Amps x 10⁶	Test #6.
93.1	.448	7	11	
100.4	.493	17	26	
108.2	.543	43	65	
113.9	.582	73	111	
120.7	.627	136	207	
124.9	.657	200	304	
128	.679	246	374	
133	.712	335	509	
136.2	.737	370	562	
140	.760	420	638	
143.8	.787	453	688	

Gal. between 3rd and negative

143.8	.787	0		

September 19, 1907.

Lamp #2. Carbon 113½ V.

After reexhausting on mercury pumps to practically 100 o/o vacuum = 761 mm of mercury with barometer at 761 mm also.

Gal. between 3rd electrode and positive.

Shunt 3.61 ω

VOLTS	AMPS	MM DEF.	= MILAMPS.	Test #7.
136	730	380	5.192	
"	"	260	3.553	After ½ min burning
"	"	460	6.285	" 2 " "
136.5	734	375	5.124	" 5 " "

Opened circuit momentarily and on closing again gal. oscillated between 150 and 310 mm. Oscillations grew more rapid and their amplitude diminished. After about 3 min. they got to 200 - 260 mm.

Opened circuit momentarily again and on closing gal. oscillated between 160 and 200 mm.

Broke circuit several times

9/19/07

more after this but each time on remaking, galvanometer oscillated the same - between 160 and 200 mm. deflection.

Power was off 1 hour at noon and lamp stood cold for that time. Then at 135.5 volts and .723 amps, deflection of gal. was 58 mm. After lamp had burned about 1 min., gal started to oscillate again - very slowly at first and with increasing speed - between 50 and 160 mm.

Tested then as follows -

VOLTS	AMPS.	MM DEF.	AMPS X 10⁶	Shunt = 36.47 ω
95.6	.460	4	6	
102.1	.500	14	21	
107.5	.537	33	50	
112.2	.568	64	97	
117.4	.602	113	172	
123.1	.640	200	305	
126.8	.664	271	413	
133.6	.711	421	642	gal. did not
137.3	.739	518	790	oscillate during
141.7	.767	645	983	this test!

9/19/07.

Lamp #2. Carbon $113\frac{1}{2}$ V.

Reexhausted a second time to 758 mm with barometer at 760 = 99.73 % vacuum.
Gal. between 3rd + positive.

VOLTS	AMPS.	MM DEF.	= AMPS X 10^6	Test #8.
142.3	.711	470	6422	- 3.61 ω Shunt

Deflection gradually increased and went off scale (650 mm.) in about ½ min. Then changed shunt to 1.806 ohms and kept lamp burning at 142 volts for a few minutes to note variations of gal. Found that the current did not pulsate as in Test #7, but it would very slowly increase and then diminish in value while voltage at lamp remained practically constant. Took readings at the maximum and minimum points as follows –

142	.713	580	15727	
"	.710	430	11660	
141.2	.703	640	17354	

(over)

9/19/07

Samp #2, Test #8, cont'd.

Then made the following test at different voltages —

VOLTS	AMPS	MM DEF.	= AMPS X 10^6	
97	.421	0	—	1.806 w. Shunt
103.9	.460	0	—	
11.0	.498	5	135	
114.2	.522	12	325	
119.1	.552	25	678	
125.9	.593	58	1573	
130	.620	106	2874	
133.1	.639	162	4393	
136.8	.663	215	5830	
140.3	.689	307	8324	
141.6	.697	360	9762	

Kept lamps burning at this voltage for about 5 minutes and deflection remained constant.

Connected small Zn/KCl/Cu cells in series with galvanometer so as to oppose flow of current thru vacuum. It took 50 of these cells to bring gal. back to zero.

September 20, 1907.

Lamp #2. Carbon 113 ½ V.
Reexhausted 3rd time to 753 mm. with barometer at 757 = 99.47 % vacuum.
Gal. between 3rd and positive Shunt = 1.806 ω.

Volts.	Amps.	MM Def.	= Amps x 10⁶
140.7	.579	190	5152
120	.452	2	54
122.2	.467	18	488
126	.488	39	1057
128.2	.500	52	1410
131	.513	79	2142
133	.522	98	2657
136.3	.540	131	3552
140	.562	195	5287
142.1	.574	247	6697
145.8	.597	326	8840

Test #9.

Deflections were fairly constant. Galvanometer did not oscillate. (over)

9/20/07.

Notes on Test #9 of Lamp #2.

In this lamp a blue glow can be seen very easily, at the negative side of the filiament. It diminishes in brightness from the end upwards and disappears entirely before reaching the curved part. It can be seen to the best advantage by looking along the filiament from the tip end of the lamp. When viewed from this position it will be seen that the glow is emitted equally from all sides of the filiament and extends outward about 2 or 3 millimeters.

When the 3rd electrode and positive lead are connected thru a low resistance shunt as in the preceding test, the 3rd electrode shows the blue emanation and appears to get quite hot so that it glows dull red.

(over)

9/20/07.

Notes Continued.

If the 3rd electrode is disconnected from the positive a curious phenomenon is observed. - Immediately there appears a bright blue glow at the positive side - but only around the cemented joint and the exposed part of the platinum sealing-in wire. This glow has very much the appearance of a CO flame and every now and then a tongue darts out in the direction of the negative. It is easy to conceive that if the lamp were heated up still higher, this tongue would finally reach across to the other side, forming an arc and fusing the platinum wires - as is sometimes done.

September 21, 1907.

Samp #2. Carbon $113\frac{1}{2}$ V.
Reexhausted 4th time to 748 mm. when barometer stood at 754 = 99.2 % vacuum.
Gal. between 3rd and positive.

Volts	Amps.	MM Def.	= Amps $\times 10^6$	Test #10.
142.2	.510	280	427	36.47 w Shunt
142.3	.513	340	2244	8.05 w " - in ¼ min
143	.518	470	2930	" " " 3 "
110	.359	0	0	8.05 w Shunt
116	.387	1	6	
122	.412	5	31	
127.2	.440	14	87	
130.7	.454	66	411	
132.8	.465	103	642	
134.9	.477	150	935	
137.6	.490	238	1484	
141	.508	388	2419	
143.9	.521	530	3304	P v.
"	.522	650	4052	After burning 2 min
147.3	.540	340	7097	2.33 w Shunt
145.2	.522	255	5322	

September 25, 1907.

Lamp #4. Carbon 113 V.
Galvanometer between 3rd electrode and positive.

Volts	Amps	MM Def	= Amps. X 10^6	Test #1.
135.5	.723	610	930	36.47 w Shunt
137	.732	580	884	After 5 min. Burn.
89.5	.422	22	46	25.6 w Shunt
95.3	.459	27	56	
102.2	.507	36	75	
106	.528	46	96	
111.2	.562	67	140	
116.8	.598	106	222	
123.3	.641	190	397	
127.8	.671	256	535	
132.9	.708	352	736	
135.5	.727	412	862	
139.1	.750	475	994	
143.8	.785	536	1121	

Opened lamp and put in a globule of mercury. Then re-exhausted on Spreigel's pump

9/25/07.

Lamp #4 cont'd.

to 100 % vacuum. Then supported lamp vertically so that the mercury was in the socket end - which keeps comparatively cool - and tested as follows:-

Volts	Amps.	MM Def.	= Amps X 10⁶	Test #2.
127.8	.672	192	6624	1.417 w Shunt
128	.676	245	8452	After 5 min. Burn.
97.2	.471	3	103	
104.5	.517	1.0	345	
112.1	.568	32	1.104	
117.3	.600	71	2449	
125	.653	163	5623	
130.6	.698	310	10695	
135	.730	490	16905	
137.8	.750	630	21735	

In this test the whole lamp was filled with a pale blue glow which did not seem to be any brighter.

9/25/07.

Lamp #4 cont'd.

around the negative leg than anywhere else. Globules of mercury condensed on the glass at the bottom, where it was cool.

Substituted a milammeter for the galvanometer - between the third electrode and positive and tested at higher voltages as follows:-

VOLTS.	AMPS.	MILAMPS.	Test #3.
125.7	.660	6	Lamp vertical
130	.697	10	as before.
134.9	.630	17	
137.2	.750	23	
141	.781	32	
144.7	.819	42	
147.7	.848	61	
130	—	10	Lamp laid down
135	—	17	so that Hg was
141	—	31	near hot filament
147.3	—	62	

(over)

9/25/07.

Lamp #4 cont'd.

Kept burning a few minutes at 147 volts until suddenly it arced from the 3rd electrode to the negative. The current at this moment must have been pretty high because the needle of the milammeter was bent considerably. The arc also fused the platinum sealing-in wires and the copper connecting wires for a short distance down and copper was plated on the bulb at two spots opposite the terminals. The glass support too, was fused considerably and the bulb was also, at the spots where the copper was plated. The whole bulb was blackened with carbon.

September 27, 1907.

Lamp # 5. Carbon - 116 V.

A square of tinfoil is shellaced on one side of the exterior of the bulb. Lamp also has the usual internal electrode of platinum.

At 146.8 V., lamp took .777 amps and "Z-Z" deflection was 155 mm. using an 8.05 ω shunt. $= 946 \times 10^{-6}$ amps. This was with the galvanometer connected between the internal 3rd electrode and the positive.

Now tried using the external tinfoil electrode in place of the platinum 3rd electrode and found there was no deflection whatever either with gal. between tinfoil and positive or tinfoil and negative.

9/27/07.

Lamp # 5. Carbon 116 V.

Introduced a globule of Hg into lamp and reexhausted to about 99.93 % vacuum. Still could get no current between either positive or negative and the external electrode.

Connected gal. between internal platinum electrode and positive and tested as follows:

VOLTS	AMPS.	MM. DEF.	= AMPS. X 10^6	Test # 2.
141.7	.750	605	20872	Shunt 1.417 w
97	.449	1	34	
104.1	.493	5	172	
110.7	.533	16	552	
118.9	.588	48	1.056	
124.3	.622	92	3174	
129.9	.460	168	5796	
133.8	.689	272	9384	
137	.712	402	13869	
140.5	.740	560	19320	
	gal. between 3rd and negative			
138	.720	302	240	Shunt 80.8 w.

September 28, 1907.

Lamp #3. Tungsten.
Introduced globule of Hg and reexhausted lamp to 100 % vac.
Gal. between 3rd and positive.

VOLTS	MM DEF. = AMPS X 10^6		Test #3.
6.11	5	.9	No Shunt.
7.00	9	2.0	
8.00	25	5	
9.00	47	9	
10.00	68	13	
11.00	91	17	
12.00	116	22	
13.00	155	30	
14.00	52	41	80.8 w Shunt

Gal. pointer suddenly swung way off of scale after lamp had been burning about one minute. Plugged in larger shunt and reading then was –

14.00	180	1122	8.05 w Shunt

Deflection kept increasing After about ½ min more it was –

14.00	320	1995

9/28/07.

Lamp #3 – Test #3, cont'd.

Allowed lamp to cool down and then tried at 14 volts again, using 8.05 w shunt.

The deflection at first was 6 mm (= .37 x 10^{-6} amps) but after about a minutes burning it suddenly went up as before to 135 mm. (= 8.41 x 10^{-6} amps) and then kept increasing slowly to still higher values. Do not know what the limit of this increase would have been because I was afraid it might arc and so opened the switch at about 400 mm deflection (= 24.93 x 10^{-6} amps.)

No deflection could be observed with the unshunted galvanometer between the 3rd electrode and the negative.

Lamp showed the blue glow when burning at 14 volts.

October 5, 1907.

Lamp #3. Tungsten.
Reexhausted to 99.89 % vacuum with Hg. still in the bulb.
Gal. between 3rd and positive.

Volts	MM. Def.	Amps X 10⁶	Test #4.
6.00	0	0	No Shunt
7.00	3	.6	
8.00	19	3.6	
9.00	40	8	
10.00	62	12	
11.00	83	16	
12.00	105	20	
13.00	132	25	
14.00	174	33	Burned 3 min. at this P.D. and "E E" was constant
15.00	250	48	"E E" constant during 3 min. burning.

October 7, 1907.

Lamp #2. Carbon.

Exhausted, then filled with Hydrogen and reexhausted to 100 o/o vacuum on Hg pump. Gal. between 3rd + positive.

Volts	Amps.	MM Def.	= Amps x 10^6.	Test # 11.
141.5	.520	350	4781	3.61 w Shunt
142	.524	330	4508	In 3 min.
115	.398	7	95	
121.5	.427	27	369	
129.8	.463	78	1065	
135.7	.493	160	2185	
141.5	.522	297	4057	
143.8	.532	370	5054	
148	.557	520	7103	

Galvanometer Shunts – Constants etc.

Ohms		Constant	1 MM Equiv. Amps. X 10^9	
Inf.	—	0	193	
2.33	J.C. $\frac{1}{99}$	108.15	20873	
3.61	6.55 $\parallel$ 8.05	70.8	13664	
6.55	E. Bros. $\frac{1}{999}$	39.47		
8.05	E. My. Co. $\frac{1}{999}$	32.3	6234	
18.48	25.6 $\parallel$ 66.5			
25.6	J.C. $\frac{1}{9}$	10.84	2092	
36.47	66.5 $\parallel$ 80.8	7.9	1525	
60.94	66.5 $\parallel$ 729	4.135		
66.5	E. Bros. $\frac{1}{99}$	4.789		
74	80.8 $\parallel$ 887	4.405		
80.8	E. My. Co. $\frac{1}{99}$	4.118	795	
400	729 $\parallel$ 887			
729	E. Bros. $\frac{1}{9}$	1.345		
887	E. My. Co. $\frac{1}{9}$	1.284		
1	Std	253		
1.718	2.33 $\parallel$ 6.55			
1.806	2.33 $\parallel$ 8.05	140.5	27116	
1.417	2.33 $\parallel$ 6.55 $\parallel$ 8.05	178.8	34508	

POCKET NOTEBOOKS

These twenty-nine notebooks, which generally measure about 3" or 4" in one direction and 6" or 7" in the other, contain notes, drawings, and calculations by Edison relating to a variety of topics, including storage batteries, phonographs and phonograph records, cement, x-ray tubes, and other experimental apparatus. Most of the entries describe experiments or other matters to be undertaken at the West Orange laboratory. There are also some speculative notes concerning electricity, acoustics, electromagnetic radiation, and thermodynamics, as well as occasional entries by other employees or experimenters. A few books appear to have been used by Edison at his winter home in Fort Myers, Florida.

The books have been filmed at a reduction ratio of 10:1.

Notebook, PN-19-04-00

This pocket notebook was probably used by Edison around 1899 for notes on chemicals, chemical reactions, cement, and experiments and projects to be undertaken. It consists of a promotional notepad distributed by the Standard Oil Co. and may have been used at Edison's winter home in Fort Myers, Florida. Included are a variety of chemical notes alluding to Henry Watts's multivolume *Dictionary of Chemistry*; notes on real estate, probably in the Fort Myers area; and notes on the chemical properties and varieties of cement. Among the experiments listed are several that involve "xyz rays."

Notebook, PN-99-00-00.4

This pocket notebook was used by Edison in 1899 or the early 1900s for lists of tasks to be undertaken. Included are notes relating to the supervision of experiments, to plant operations and outfit, and to other business matters. Among the activities listed or described are battery experiments, meter experiments, and work pertaining to magnetic ores, gold ore, and limestone. Also included are rough survey notes made by Edison at the Cahart property in Stewartsville, New Jersey, where limestone was later quarried for the Edison Portland Cement Co.

Notebook, PN-00-10-17

This pocket notebook contains dated entries from May and October 1900. Some of the May dates have been changed to October. The pages consist of blank forms printed for use at the New Jersey and Pennsylvania Concentrating Works at Ogden, New Jersey. The entries, all of them by Edison, appear on the back of the forms. Many relate to battery experiments, including cadmium and other electrodes to be tried and various electrolyte solutions to test. Among the other tasks mentioned are the supervision of construction at the Edison Portland Cement Co. plant and consultations with Walter S. Mallory and other employees. Also included are lists of books to order and phonograph experiments to perform.

Notebook, PN-00-01-01

This undated pocket notebook was used by Edison, probably in 1901. It may have been carried on his surveying trip to the Sudbury region of Ontario during that year. It contains a record of ore samples obtained and properties seen or discussed. The entries indicate the location and accessibility of mines, their owners, and property values. Other notes list possible sources of nickel elsewhere in Canada and the United States, often giving names and addresses of mining companies and other suppliers. Scattered pages contain notes regarding experiments on briquetting, battery plates and electrolytes, and other matters. Included are two pages with the heading "new force," which describe experiments to be performed with a Marconi device, electromotograph, and chalk telephone.

Notebook, PN-02-01-02

This pocket notebook consists of a promotional calendar printed for distribution by the Vulcan Iron Works Co. Three pages from January 1902 were used by Edison for notes regarding battery experiments to be performed, as well as a briquetting experiment. Most of the proposed battery experiments involve the use of various electrolyte solutions.

Notebook, PN-03-02-10

The one dated entry in this pocket notebook is from February 1903. All entries are by Edison. The book contains notes and drawings pertaining to experiments to be performed, including work on batteries, electric meters, lighting, and x-ray apparatus. Among the employees mentioned in relation to individual experiments are Cloyd M. Chapman, Frederick P. Ott, John F. Ott, and Charles N. or Albert F. Wurth.

Notebook, PN-03-10-06

This pocket notebook consists of a diary for 1902. It was used by Edison during October 1903, September-November 1905, January 1906, and possibly at other times for notes and drawings regarding experimental work and other tasks to be performed at the laboratory. There are numerous proposed experiments relating to the chemical composition of components for Edison's alkaline storage battery, along with others pertaining to the location, assay, refinement, and use of nickel and cobalt ores. Some of the entries identify various groups of test cells, while others list experiments involving ores from the Darby mine in the Sudbury region of Ontario. There are also entries concerning phonographs, electromotographs, and operations at the Edison Portland Cement Co. plant. Among the many employees mentioned in relation to individual tasks are Jonas W. Aylsworth, Emil Herter, Walter E. Holland, Walter S. Mallory, and Peter Weber. In addition, there are some entries pertaining to business, clerical, and family matters. These include one note about sending money to the Edison children for Christmas and reminders about communications with Sigmund Bergmann, Frank L. Dyer, and William E. Gilmore.

Notebook, PN-04-06-04

This pocket notebook was used by Edison during the period June-October 1904 for notes on experimental work to be performed. Among the experiments described are many that pertain to the chemical composition, construction, and electrical capacity of Edison's alkaline storage battery. In some cases Jonas W. Aylsworth is indicated as the proposed experimenter. Also included are several pages of rough calculations, a list of the number of employees working for various departments of the Edison Storage Battery Co., and a note about a worker at the Edison Phonograph Works.

Notebook, PN-04-07-21

This pocket notebook was used by Edison and an unidentified employee, probably during the summer of 1904. Many of the entries relate to production costs for Edison's alkaline storage battery. Included are labor distribution figures and notes on piecework rates, materials, and other manufacturing costs. There are some similar figures for the Edison Portland Cement Co. In

addition, the book contains entries by Edison regarding experiments to be performed, including work on storage batteries and a Lansden electric vehicle. Also included is a list of machinery necessary for manufacturing rubber parts. Inserted into the book is a report on labor and material costs at the Edison Storage Battery Co. works in Glen Ridge, New Jersey, for the week ending July 13, 1904, along with 2 pages of loose notes.

Notebook, PN-05-02-07

This pocket notebook was used by Edison during the period November 1904-February 1905 for notes on experimental work and for lists of tasks to be performed. Many of the proposed experiments pertain to the chemical composition, construction, and charge and discharge conditions of storage batteries. Included are entries describing groups of test cells, some with nickel flake elements in their electrodes. There is also a note by Edison reminding himself to see Frank L. Dyer about filing a patent application on the nickel flake. Among the employees mentioned in relation to individual experiments are Ralph Arbogast, Jonas W. Aylsworth, and Walter E. Holland.

Notebook, PN-04-12-27

This pocket notebook was used by Edison during the period December 1904-March 1905. It contains notes and drawings pertaining to experimental work to be performed and reminders about business and legal matters. Many of the proposed experiments relate to the chemical composition of components for storage batteries and to the construction of groups of test cells. Included are tests regarding the charge and discharge of Edison and Gibbs cells, as well as experiments with nickel flake electrodes. Also included are notes relating to patent questions for Frank L. Dyer; business matters to discuss with William E. Gilmore; a plant operations matter for Emil Herter at the Edison Portland Cement Co. works; and questions about graphite for Edward G. Acheson. The undated entries at the beginning of the book may have been made at the Edison Portland Cement Co. works in Stewartsville, New Jersey. Among the employees mentioned in relation to individual experiments are Jonas W. Aylsworth, Robert A. Bachman, John F. Ott, and O. A. Rogers.

Notebook, PN-05-03-05

This pocket notebook consists of a calendar for 1905. It was used by Edison during March 1905-April 1906, and again during early 1908, primarily for notes regarding experimental work and other matters to be undertaken at the laboratory. Many of the proposed experiments pertain to the chemical composition and performance of Edison's alkaline storage battery. These include investigations of swelling in the positive electrode pockets, tests of various tubes for the same purpose, related chemical research, and the notation of mileage and routes for an electric vehicle. There are numerous experiments on metallic flake for battery electrodes, including one on cobalt flake marked "Curious!" A few notes and drawings relate to experiments with phonographs. The book also contains notes about the location and availability of cobalt ores in North Carolina and elsewhere. The North Carolina entries are copied from a book identified as "Wurtz." Included as well are notes about arsenical compounds and reactions; notes about the properties of bismuth; an entry by Edison reminding himself to notify Frank L. Dyer about filing a patent application on

the use of cobalt in storage batteries; and some rough calculations and measurements, including cost analysis figures for the Edison Portland Cement Co. works. Among the employees mentioned in relation to individual experiments are Ralph Arbogast, Jonas W. Aylsworth, Otto Groethe, Frederick P. Ott, John F. Ott, and Ludwig F. Ott.

Notebook, PN-06-00-00

This undated pocket notebook was used by Edison, probably during 1906. It may have been used at his winter home in Fort Myers, Florida. Included are descriptions and lists of experiments to perform, including work on phonographs, storage battery components, electrical rectifiers, telephones, thermocouples, and "wireless." The entries contain Edison's speculations regarding magnetism, the chemical properties of various metals, and the nature of electricity. There are also notes on the "Edison effect" and on work by Michael I. Pupin and other scientists. Among the employees mentioned in relation to individual experiments are Charles Dally, Otto Groethe, Walter E. Holland, and Frederick P. Ott.

Notebook, PN-07-00-00.1

This undated pocket notebook was used by Edison, probably during 1906 or 1907. It resembles PN-06-00-00 in content. Included are lists and descriptions of experiments to perform, as well as more speculative notes regarding the "Edison effect," x-rays, electricity, "wireless," and the properties of light and of metals. Many of the experiments pertain to the chemical composition and construction of storage battery components. Others relate to thermocouples, electromotographs, and acoustic devices. Among the employees mentioned in relation to individual experiments are Ralph Arbogast, Charles Dally, Walter E. Holland, Frederick P. Ott, John F. Ott, and O. A. Rogers.

Notebook, PN-07-02-04

This pocket notebook contains two dated entries from February 1907. It was used by Edison for notes on experiments and other tasks to be performed. Many of the proposed experiments pertain to storage batteries, phonographs, and related chemical research. Included are entries describing groups of test cells, outlining chemical experiments with tungsten and tungstate compounds, and remarking upon a "new stuff" made by Jonas W. Aylsworth (possibly a phenolic resin). There is also a drawing of a phonograph reproducer, with a notation that it was given to patent attorney Frank L. Dyer. Among the employees mentioned in relation to experimental work or business matters are Thomas D. Greenley, Otto Groethe, Emil Herter, Frederick P. Ott, John F. Ott, Ludwig F. Ott, and Herman Wolke.

Notebook, PN-07-03-02

The one dated entry in this pocket notebook is from March 1907. The book, which was probably used in part at Edison's winter home in Fort Myers, Florida, contains notes by Edison regarding experimental work and other tasks to be performed. Included are experiments pertaining to x-rays and "xyz rays," the "Edison effect," electromotographs, electric lights and rectifiers, "wireless," and batteries. Some of the proposed experiments involve the use of radium, photographic paper, fluorescent crystals, and cocaine. One experiment involves the lamp of a projecting kinetoscope; another relates to the growing of a plant in the dark while watering it with

chlorophyll juice. The entries in the first half of the book are more speculative than those in the second half and include a reference to an unknown ray in the ether. The last page contains a list of landscaping tasks at Fort Myers. Among the employees mentioned in relation to individual experiments are Ralph Arbogast, William G. Bee, Thomas D. Greenley, Otto Groethe, John F. Ott, Ludwig F. Ott, and O. A. Rogers.

Notebook, PN-07-00-00.2

This undated pocket notebook was used by Edison, probably during 1907. It includes lists and descriptions of experiments to perform, reminders about patent and business matters, and notes taken from a book or books on the recovery of silver from nickel and cobalt ores. Many of the experiments pertain to the composition and manufacture of storage battery components and to related chemical researches. Others deal with phonograph reproducers, the composition of phonograph record blanks, cement kilns, and electromotographs. Also included are a number of speculative notes on the properties of light, the nature of electricity, and the use of cocaine as an anesthetic. Among the employees mentioned in relation to individual experiments are Ralph Arbogast, Thomas D. Greenley, Walter E. Holland, Frederick P. Ott, Ludwig F. Ott, and Charles N. or Albert F. Wurth. Employees mentioned in regard to other matters include Frank L. Dyer, Walter S. Mallory, John V. Miller, and H. I. Moyer. In one case Edison considers notifying Dyer about filing a patent application on a method for making metallic flake for storage batteries. Elsewhere there is a reminder to write Mallory about bauxite and a blast furnace.

Notebook, PN-07-06-15

This pocket notebook was begun by Edison in June 1907 and was probably used until mid or late 1908 for notes and drawings regarding experimental work and other tasks to be performed at the laboratory. Many of the experiments pertain to the composition and performance of Edison's alkaline storage battery. Others relate to phonographs and phonograph records; radium, "scintillation," and radiation; the chemical properties of boron and boron compounds; and Edison's kinetophone. Among the employees mentioned in connection with individual experiments are Ralph Arbogast, Walter E. Holland, Alexander N. Pierman, and Herman Wolke. The book also contains numerous entries regarding patent, business, and personal affairs. Included is a reminder to pursue a patent on a "new kiln aging process" for cement and to evaluate recent patents on phonograph record blanks. Also included is a comparison between process patents and musical copyright. In addition, there are notes pertaining to Edison's investments, the Essex Press, the Douglas Phonograph Co., the costs of cement production, and market shares among motion picture companies. Employees mentioned in regard to these matters include Frank L. Dyer, William E. Gilmore, and Alphons Westee. Among the entries of a personal nature are notes on medical books, including one work by William Osler and another about intestinal diseases, and a remark about "setting [the] NY Sun right" on who invented the kinetograph.

Notebook, PN-07-09-15

This pocket notebook contains dated entries from September and October 1907. It was used by Edison for notes and lists regarding experimental work and other tasks to be performed at the laboratory. Among the experiments listed or described are many dealing with alkaline storage batteries and phonographs. Other entries pertain to electromotographs, rectifiers, telephones, telegraphs, and thermocouples. Also included is a suggestion about using magnetic markers on films and records to start moving pictures and sounds simultaneously on the

kinetophone. Among the employees mentioned in relation to individual experiments are Ralph Arbogast, Thomas D. Greenley, Otto Groethe, Walter E. Holland, and Albert F. Wurth. The non-experimental entries include reminders about patents, popular music, and product names, along with notations regarding the authorized biography of Edison by Thomas C. Martin, Frank L. Dyer, and William H. Meadowcroft.

Notebook, PN-07-00-00.3

This undated pocket notebook was probably used by Edison during late 1907 and may have been used in early 1908. It contains notes and lists regarding experimental work and other tasks to be performed at the laboratory. Many of the experiments pertain to the composition and performance of alkaline storage batteries and to related chemical researches. The entries describe groups of test cells, indicate experiments with bismuth compounds, and list insoluble alkalis. Other experiments relate to dynamos, phonographs, the hardness of phonograph record blanks, molds and tints for cement, electromotographs, and an amplifying device. Among the employees mentioned in relation to individual experiments are Robert A. Bachman, Walter E. Holland, George H. Hooper, Jr., Ludwig F. Ott, and O. A. Rogers. There are also notations about patent, business, and clerical matters. Included are reminders to talk with Frank L. Dyer about a patent on a speaking kinetoscope and about possible legal action against a phonograph dealer; to suggest marketing ideas to William E. Gilmore; to instruct John F. Randolph about signing checks; to contact Walter S. Mallory and William H. Mason at the Edison Portland Cement Co.; and to dispatch William G. Bee to do research on electric vehicles licensed in different states. Also included are notes about printed sources that illustrate architectural details, for potential use with a molded concrete house; and listings of the numbers of motion picture films sold during autumn 1907. Three loose sheets containing entries by Edison on phonograph patents have been inserted into the book.

Notebook, PN-03-00-00

This pocket notebook was used by Edison, probably during 1909. It contains notes pertaining to finances, experimental work, book orders, and the supervision of employees. Included are calculations of cement production costs and projected profits from phonograph records, notations regarding accounts to be checked by Alphons Westee, and lists of patent questions to be asked of Frank L. Dyer. Also included are notes and drawings about battery experiments to be performed, including work on the composition and manufacture of components. Other experiments to be conducted relate to x-rays, motion picture film, phonograph reproducers, records and recording, phenolic resins, mechanical amplification, and tints and molds for concrete. Among the numerous employees mentioned in relation to individual experiments are Jonas W. Aylsworth, Daniel Higham, Walter E. Holland, and John F. Ott.

Notebook, PN-09-07-20

This pocket notebook was used by Edison during 1909 and 1910 for notes on experimental work and other tasks to be performed at the laboratory. Many of the experimental entries pertain to phonographs. Included are notes about various reproducers, possible amplification devices, phenolic resins and other materials for record blanks, cabinet design, and recording conditions. Also included are references to phonograph marketing, musicians, litigation, patents, and sales. Among the employees mentioned in connection with these matters are Jonas W. Aylsworth, Frank L. Dyer, William Goodwin, Walter H. Miller, Alexander N. Pierman, and Peter Weber. There is also

a reminder to send private investigator Joseph F. McCoy to the Victor Talking Machine Co. works in Camden, New Jersey, and the American Graphophone Co. works in Bridgeport, Connecticut. Other entries indicate the number of musical selections from 1902 to September 1910, along with the amount of sales to March 1910. One notation providing the names of musicians is in an unidentified hand. In addition, the book contains notes on electric vehicles, storage batteries, cement production, and motion picture rentals. Employees mentioned in regard to these concerns include John R. Anderson, Jr., Herman E. Kiefer, Walter S. Mallory, and William H. Mason. There are also entries pertaining to Edison's life insurance, the transfer of property to Mina Miller Edison, and the use of space at the laboratory.

Notebook, PN-09-08-10

This pocket notebook was used by Edison during 1909, although the inside front cover bears the date of April 28, 1919. It contains notes regarding experimental work and other tasks to be performed at the laboratory. Like PN-09-07-20, this notebook indicates Edison's renewed commitment to work on his phonograph toward the end of 1909. Among the experiments described are many suggesting new materials for phonograph record blanks, new reproducers, sapphire and diamond styli, and recording apparatus. Other entries relate to musicians and musical instruments for recording sessions, motion picture marketing and distribution, kinetophones, long tubes for battery electrodes, paints and tints for cement, and the cost of limestone. Also included are estimates of Edison's royalty income, along with reminders to inquire about the value of his property in Glen Ridge, New Jersey, and to check on patents for cement kilns, storage batteries with lithium hydroxide electrolytes, and new natural and synthetic materials for phonograph record blanks. Among the individuals mentioned in regard to experimental and other work are Frank L. Dyer, Otto Groethe, Daniel Higham, John Lansden, and Dyer Smith.

Notebook, PN-10-04-13

This pocket notebook contains one dated entry from April 1910. It was probably used by Edison at his winter home in Fort Myers, Florida, as well as at the laboratory in West Orange. The book contains notes regarding experimental work and other tasks to be performed. Among the experiments are many chemical researches relative to Edison's alkaline storage battery and to phonograph record blanks. Other experiments pertain to motion pictures, color photography, business phonographs, and phonograph reproducers. An entry marked "Big Scheme" proposes using heat from the Edison Portland Cement Co. kilns to generate electricity. The employees mentioned in relation to individual experiments include Ralph Arbogast, Walter N. Archer, Eben G. Dodge, Pursell Eggleston, Ignacy Goldstein, Thomas D. Greenley, and Walter E. Holland. The notebook also contains many notations and reminders about patents, production costs, marketing, and other business matters. Included are notes pertaining to recording artists Leo Slezak, Arturo Nutini, and Harry Lauder, and a reminder to send storage battery data and a catalog to "Jack" Morgan at J. P. Morgan & Co. Near the end of the book are tabulated costs for battery and cement production, statistics on the production of chemicals, and a financial profile of the Edison Portland Cement Co. as of October 1909.

Notebook, PN-10-05-01

This pocket notebook was used by Edison during 1910 for notes regarding experimental work and other tasks to be performed. Many of the entries relate to proposed applications for Edison's alkaline storage battery and to the marketing, sale, and performance of cells. Included are reports of road tests made with electric vehicles; statistics on the cost and efficiency of electric traction and on the use of electric trucks in New York City; notes on battery shipments, production costs, and related assets; and descriptions of experimental work on phonograph reproducers, recording methods, and cabinets. There are also entries pertaining to the hiring of Converse D. Marsh to promote the battery and Sydney W. Ashe to research its use in locomotives; a reminder to contact J. P. Morgan, Jr., or George W. Perkins about approaching the Southern Railway Co. for battery business; and occasional notations about cement, phonograph sales, and various advertising ideas. Among the employees mentioned in relation to individual tasks are John R. Anderson, Jr., Ralph Arbogast, Robert A. Bachman, Frank L. Dyer, Walter E. Holland, and Carl H. Wilson.

Notebook, PN-10-05-10

This pocket notebook was used by Edison in 1910 for notes regarding experimental work and other tasks to be performed at the laboratory. Many of the entries pertain to the composition and manufacture of phonograph record blanks and to storage battery electrodes. There are also notes on tungsten lamp filaments, color photography, cement production, and storage battery performance in electric vehicles. Among the employees mentioned in regard to experimental work are Walter N. Archer, William G. Bee, Charles Dally, Ignacy Goldstein, and Walter E. Holland. The book also contains many notations of a non-experimental nature. Included are reminders about music and musicians, notes on possible names for a new large-diameter amberola record, lists of employees, and ideas for promoting Edison's storage battery among owners of electric vehicles in New York and New Jersey. Tabulated data at the end of the book provide details regarding battery production, cement shipments, projected income, battery performance summaries, and the volume of cement necessary for a poured concrete house.

Notebook, PN-10-11-01

The one dated entry in this pocket notebook is from November 1910. The book was used by Edison for notes regarding experimental work and other tasks to be performed at the laboratory. Most of the entries pertain to storage batteries and phonographs, but there are also notes about telephones, chemical researches, and various uses for the phenolic resin, condensite. The battery experiments include modifications of battery cans, trays, rubber parts, and tubes, as well as variations in electrolyte and methods of manufacture. The phonograph experiments involve the composition of phonograph record blanks, recording apparatus, and reproducers. Also included are ideas for marketing the batteries and phonographs, questions about infringement suits and patents, and data on labor. In one entry Edison plans to divide the laboratory's engineering department into several departments: "Battery -- Leland & Storage; Motors, Rectifiers; Kinetoscope; Phonoghs; Miscellaneous." In other entries he mentions the work of Leo H. Baekeland, proposes to have Paul H. Cromelin handle Edison products in Great Britain, plans to develop a $35 hornless phonograph model, decides to check on the progress of submarine batteries, and questions whether Ralph H. Beach should run his battery-powered streetcars in New Jersey. Among the employees mentioned in relation to individual experiments are Jonas W. Aylsworth, Charles Dally, Frank L. Dyer, Miller Reese Hutchison, and George F. Scull.

Notebook, PN-10-00-00.2

This undated pocket notebook was used by Edison, probably during 1910 and 1911 and possibly as late as 1912. Several entries may have been made in August 1911, while Edison traveled in Europe with members of his family. The book contains notes and drawings regarding experimental work and other tasks to be performed at the laboratory. Many of the experiments relate to improvements in storage batteries, phonographs, and phonograph records. Other entries pertain to Edison's kinetophone, concrete cabinets for phonographs, educational films, and stereoscopic effects and color photography for motion pictures. Among the employees mentioned in connection with individual experiments are Ralph Arbogast, Jonas W. Aylsworth, Pursell Eggleston, Ignacy Goldstein, Walter E. Holland, Miller Reese Hutchison, and Alexander N. Pierman. The battery-related entries include notes on the composition and performance of cells and a list of sixty-nine items, entitled "uses for battery," describing applications in electric vehicles, tricycles, and submarines; in automobile and home lighting; in sailing vessels, with windmill power; and in other devices such as miners' lamps, burglar alarms, and dentist drills. Also included are entries pertaining to the manufacture of nickel hydroxide and to clutch devices for trucks. In addition, there are plans for making phonograph records out of condensite, shellac, hard rubber, and celluloid; proposals for recording popular songs and the sounds of naval gunnery; and ideas about marketing phonograph records. Among the individuals mentioned in relation to Edison's business affairs are Henry H. Harjes in Paris; Etienne de Fodor in Budapest; and his European representatives, Paul H. Cromelin, Maurice E. Fox, Thomas Graf, and John F. Monnot. There are also entries pertaining to personal and family matters, including references to the estate of John Kruesi and a draft telegram, probably to Edison's daughter, Marion Edison Oeser, regarding a rendezvous with his son-in-law, Oscar Oeser, in Switzerland.

Notebook, PN-Undated.19

This undated pocket notebook was probably used by Edison during the early 1900s. Included are notes about two chemical experiments, one involving rosin oil and lime and the other glycerine and other compounds. Also included are a drawing and some miscellaneous calculations.

Notebook, PN-19-04-00

This pocket notebook was probably used by Edison around 1899 for notes on chemicals, chemical reactions, cement, and experiments and projects to be undertaken. It consists of a promotional notepad distributed by the Standard Oil Co. and may have been used at Edison's winter home in Fort Myers, Florida. Included are a variety of chemical notes alluding to Henry Watts's multivolume *Dictionary of Chemistry*; notes on real estate, probably in the Fort Myers area; and notes on the chemical properties and varieties of cement. Among the experiments listed are several that involve "xyz rays." The book has been used in both directions. The last page contains a printed calendar for 1896 and an inscribed date of April 1919. That date may relate to the four- and five-digit numbers, possibly battery cell numbers, on the adjacent page and to similar numbers a few pages away. The front cover is stamped "Compliments of Standard Oil Company, Newark Branch, Newark, N.J." The pages are unnumbered. Approximately 35 pages have been used.

Our Standard Lubricating Oils.

CAPITOL CYLINDER OIL
MODEL CYLINDER OIL
SHIELD CYLINDER OIL
RENOWN ENGINE OIL
ELDORADO ENGINE OIL
ELDORADO CASTOR OIL
ATLANTIC RED ENGINE
MAGNETO MACHINERY
EXTRA GOLDEN MACHINERY
GOLDEN MACHINERY
UNION THREAD CUTTING OIL
WOOL OILS   MINER'S OILS
LEATHER OILS   GREASES
EMERALD BOILER OIL
ALL VACUUM OIL CO.'S BRANDS
600 W. CYLINDER OIL
ARCTIC ENGINE OIL
AND ALL PRODUCTS OF
PETROLEUM

Mercuro-chloride of
Cerium Colorless
Cubes

Chrysanmates
remarkable Crystals
towards light.
its a Condensation
product oxy Benzoic
acid -

Arsenic persulphide
gives large number
double salts
Watts 3rd Sup 129

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Petroleum.

Leland

Peroxides Ba Sr Ca insoluble
precipitate Hydrates within Carbon
plates & place them in solution
Peroxide Hydrogen —

Iodates of heavy metals Fe etc
insol & Easily give up 3 at
Ox — leaving Iodide of the
metal —

Ferric hydrate completely
dehydrated by bring up to
168 @ 200 centg in Conc
sol of Chloride Calcium or
Sodium

Make Pean DeGilles Insol Ferric Hydrate described Watts p. 395. This may be the oxide I get fm Monosulfide there is 2 or 3 ways of making Ly all

1 ditto Oxchloride top pp 378 Watts 379 —

See Watts 2nd Sup p 687 abt Ferric Chl —

Make some Magnetic Hydrate & dry & test in grid for storage for Oxdz6ble Element ratio for Oxdz — its probable that it can be used in Lalande's make several pie plates full —

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also make mixture of $FeCl_2$ & Fe_2Cl_6 in right proptns put in Carbon plate & ~~oxide~~ try for Lalande

Nitride of Iron Easily made 85% Iron 1st Sup Watts p 751

to get rid of basic salts when pptg Ni salts by Soda, boil the precip —

~~Its possible that alkaline sol of the formates of Iron & Ni will produce finely divided metal when boiled~~

"Ni & Fe are ppd from boiling alkaline Solution of their Formates or Hot Solution by Zinc dust

Try pptg boiling
Ferrous also Ferric Chl
by Zinc dust & Ext of
Excess Zn by very weak
acid –

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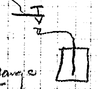
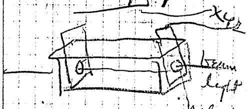
Loco	200
Brake	150
Bottom	145
Top	200
364	150
Engr	250
Dynamo	150
Cleaner	125
Top Dryer	150
Furnace	175
Sampler	125
Mixer	175
Topman	175
	2170

XYZ



Chemical change of the Oleum must send Vibrations along wire & be detected by XYZ

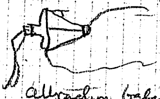
Beaker Metal & are acid



Nickel sheet —

Try continuous & intermittent beam & liquids that absorb certain waves of light, Entering beam absorbed at right end hence a wave will pass via wires —
Try conducting & non conducting liquids & metals —

Make telephone of
try highly Crystaline
Cast sticks of metals



attraction between
the Crystals Make a
Knock when current
passes - try best
thermo alloy

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Fluorite phosphoresces by
heat & then loses its
Capacity - This is restored
by Electricity = for
fluorescent Lamp

~~Cast steel platinum with~~
~~The Heat phosphor &~~
~~use pass current thro~~
~~it~~ Combine a heating
& Electrifying device
together so it will
not lose its power

Select 1/2 doz best
Therms alloys +
melt + pour in
Concentrated field
of mag + other 1/2 outside
test ske if any difference

In Electric furnace
make alloys of
Rare Metals by mixing
Oxides Etc & reducing by
Charcoal, Sugar Carbon
Etc also with a Common
metal + oxide of a Rare
Etc =

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Pass a strong Current thro
the Vacuum deposit on
glass of gold plat, Silver
Copper, Nickel + at
same time notice any
Change of a beam of
light by Eye + Spectroscope
also try it in bridge
+ see if light X Ray
Radiant heat Magnetism
Changes Res —

C E Reed
Bartow Tube Well
Works Bartow Fla

Possibly a storage battery can be obtained with Iron & say Vanadium as a depolzr ~~iridium~~ or other metal with ammonia as the solution or Chl ammonia, with ammonia?

The reason I did not get good results with Bismuth is that I did not try it for a depolzr & didnt have graphite - try it again
Bismuth pentoxide is obtained by heating Bismuthic acid to 130 Cent its an extremely unstable oxide when heated gives O also when heated with H_2SO_4 - & Chlorine when heated with HCl -

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This action is somewhat like Nickel -
Bismuthic acid is obtained by passing Chlorine into KOH containing Bi Trioxide in suspension. This again is like Nickle -
Bismuthic acid is unfortunately a little Sol in KOH -

Gold trihydroxide decomp when exposed to light giving off O -
Photo for XYZ,
Chloro-auric acid
Sandwich light
Photo XYZ

When excess lime water added to platinic Chloride & Exposed to Light a white or yellowish precip of platinate of Lime thrown down.

Phats XYZ

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Hugh McDonald
Lot next to Langford
35 large Trees
Some grape fruit out
1 acre - 210 ft on
River highest
bank in town,
$2650 —.
180 ft deep on main st

McGregor place about 7 acres - $6000 -
pretty near all trees,

2 1/2 acres all in trees
200 trees - $2000 -
next time -

4 acre piece 300 yards
from my place towards
town, 2500 not
improved -

Mrs Bates 1 1/2 acre -
House on it fairly good -

asking 4000, Uncle
Can be bought for
3 or 3500 -

'96	Sun.	Mon.	Tues.	Wed.	Thu.	Fri.	Sat.
Jan.	...	...	...	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	...
Feb.	...	...	...	...	...	...	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	...	...	...	...	...	...	...
March	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	31	...	...	...	...
April	...	...	...	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	...	...
May	...	...	...	...	...	1	2
	3	4	5	6	7	8	9
	10	11	12	13	14	15	16
	17	18	19	20	21	22	23
	24	25	26	27	28	29	30
	31	...	...	...	...	...	...
June	...	1	2	3	4	5	6
	7	8	9	10	11	12	13
	14	15	16	17	18	19	20
	21	22	23	24	25	26	27
	28	29	30	...	...	...	...
	...	...	...	...	...	...	...

'96	Sun.	Mon.	Tues.	Wed.	Thu.	Fri.	Sat.
July	...	...	...	1	2	3	4
	5	6	7	8	9	10	11
	12	13	14	15	16	17	18
	19	20	21	22	23	24	25
	26	27	28	29	30	31	...
Aug.	...	...	...	...	...	...	1
	2	3	4	5	6	7	8
	9	10	11	12	13	14	15
	16	17	18	19	20	21	22
	23	24	25	26	27	28	29
	30	31	...	...	...	...	...
Sept.	...	...	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	...	...	...
Oct.	...	...	...	...	1	2	3
	4	5	6	7	8	9	10
	11	12	13	14	15	16	17
	18	19	20	21	22	23	24
	25	26	27	28	29	30	31
	...	...	...	...	...	...	...
Nov.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14
	15	16	17	18	19	20	21
	22	23	24	25	26	27	28
	29	30	...	...	...	...	...
Dec.	...	...	1	2	3	4	5
	6	7	8	9	10	11	12
	13	14	15	16	17	18	19
	20	21	22	23	24	25	26
	27	28	29	30	31	...	...
	...	...	...	...	...	...	...

Apl 1919 Ent

[THIS BOOK WAS USED IN BOTH DIRECTIONS. THE FOLLOWING PAGES WERE FILMED FROM THE BACK END FORWARD.]

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1046 – 25%
10741 15%
1037 25%

Total weight of a truss is as to the square of its length,

The amount or lbs of steel per foot of span is directly as to the span

20 ft span 6.46 # lbs per ft
40 12.9

but total wt goes as the square

20 ft Total wt 129 lbs
40 516

Ties in a fink truss are only 3/10th of its entire weight -

In a Fink truss if with a rise of $\frac{1}{5}$ the weight be 8000 lbs the raise is reduced to 1/10th the weight will be 16000 lbs.

Portland Cement

In large work "Displacers" can be used - Each must not be nearer than 12 inches = well grouted around it =

A cement requiring 2 hours or more to set is called a slow cement

Cement is rendered slow setting by long storage, its tensile strength increases if kept dry & in a place free from draughts, (German Spec)

French reject cement containing over 1% Sulphuric acid or sulphur in weighable quantities or 4% oxide Iron or give a value lower than $\frac{44}{100}$ for the proportion between the total weight of the Combined Silica & Alumina on the first part & weight of the Lime on the other part

1130 20

1124 ~~3~~50

1124 5

1128 40

1124 15

Setting properties of Cement can be altered to any extent (ie) modified by prolonged aeration, Butler page 286

A cement is aerated in very damp weather (ie) air laden with moisture exposed portions liable to be coagulated, or what is known as air set by which a great part of its volatility would be lost

Aeration increases bulk of cement as much as 6% as it absorbs water + CO_2

Aggregates + sand should have no dust + surfaces should be rough + porous

The greater the quantity of Alumina present the quicker the setting. Being the most soluble ingredient it supersaturates the water first & commences to crystalize

It is preferable that a cement should contain less than 3% Magnesia the less the better —

Well burnt clinker dark porous = slightly underburnt is lighter. Underburned still lighter while much underburnt is yellow —

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A cement spread out on a tray for 3 years gave as good tensile as another portion in a closed can

If a cement containing gypsum is permitted to stay in a sack for several weeks it develops poor strains at the early date of testing

Cause of retardation of setting by gypsum due to formation of Sulpho-aluminate Lime

No aluminate of lime is dissolved ~~when~~ in water, when a mixture of sulphate Lime & Slaked lime is shaken up with water. The aluminate of Lime in Cement is thus hydrated slowly

Aluminate of Lime is the cause of rapid setting

If there is no free Lime in the Cement gypsum will not prevent its rapid setting. To a certain Cement gypsum was added it set in 18 hours on neutralizing free Lime by Carb Soda it set in 30 minutes notwithstanding the gypsum —

A cement containing gypsum exposed to the air several days becomes quick setting if now a small quantity Slaked Lime be added it is rendered slow setting. The free Lime previously in had become Carbonated by the absorption of CO_2 from the air

Gypsum is generally mixed with the clinker before grinding but its not easy to do it properly

Cement containing an excess of clay is generally very quick setting & is never very strong

Cement can be used
20 deg below zero if
Hot water with Salt in it
is used, There is an after
Efflorescence

Lime combined as Silicates
& aluminates are the active
ingredients of Cement, The
greater the % of these the
stronger the cement,

2 Cement having same
analysis, ground & burnt
the same degree of hardness
one good the other utterly
bad because prosound one
had its ingredients badly
mixed

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2% gypsum added to Cement in a
Closed flask
Initial set after mixing

1 day	3 hours
1 month	2 h 50 m
2 "	1 h 30 m.
5 "	— 10 min

Shows cement with gypsum should
not be stored over 2 months.

---

1 Sample Cement, initial set

	minutes
0.5% gypsum	50 "
1.0% "	2 H 40 "
1.5 "	2 " 57 "
2.0 "	3 "
3.0 "	3 "
4.0 "	3 " 30 "

Gypsum generally increase
strength Cement when less
than 2%

Aluminate of Lime is insoluble in a saturated Solution of Lime

2% Gypsum allowable but many cements rendered sufficiently slow setting with 1/2 percent,

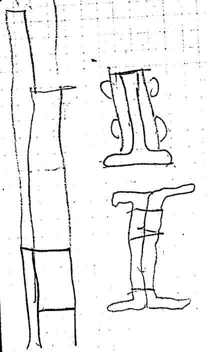
long aeration will do same, thing as gypsum, the aluminate of lime becoming air hydrated ~~but little air slaked as cement as free lime would be carbonated~~

A cement which blowed by Fayjas test because ground Coarse was sound when ground to pass 180 mesh by same test,

The defect of fine grinding is to cause Cement to set quicker, The aluminate of lime dissolving & crystalizing with great rapidity —

Same Cement pat		Tensile
32 oz Cement	5 oz H_2O	412
"	6 "	440
	7 "	367
	8 "	314
	9 "	214
	10 "	182

5 oz too dry 6 cd be worked



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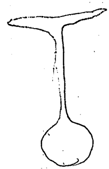


Sand test best test, both neat & sand showed to be made — defect of sand is that it requires 28 days to be of Value —

Notebook, PN-99-00-00.4

This pocket notebook was used by Edison in 1899 or the early 1900s for lists of tasks to be undertaken. Included are notes relating to the supervision of experiments, to plant operations and outfit, and to other business matters. Among the activities listed or described are battery experiments, meter experiments, and work pertaining to magnetic ores, gold ore, and limestone. Also included are rough survey notes made by Edison at the Cahart property in Stewartsville, New Jersey, where limestone was later quarried for the Edison Portland Cement Co. The front cover is stamped "Pass Book" and is marked "file Sketch" in Edison's hand. The book contains 77 numbered pages, most of which are blank, followed by one unnumbered page.

PN-(99-00-00)

I have marked and logged

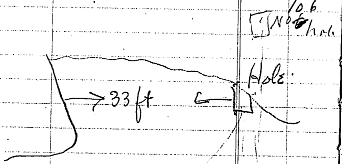
Drill hole No 1 up to
44ft 1" - which was 5th
sample - Thursday 12 noon

I notice coming from
Hotel S/W

[illegible]

apparently a
Magnesium
outcrop
Sample 10

This is the outcrop on Cahart,



Says this hole was Limestone according to the assay -

No 106 Hole is almost 1e within 4 feet of the line + he says he sent sample of holes 106

(3)

If this is so then there is a ledge of Limestone abt 35 ft wide -

Slag - (Obsidian like)
Dust coal Burning under Corder

Si 43.
Al 21
Fe_2O_3 27
CaO 5,88

~~Heaters~~

CuOx plate -

~~Try Sunderland oven in [illegible]~~

~~Test Dricktown Cave made Thursday~~

~~See about arch for ovens -~~

~~See about [illegible] belt more -~~

~~State of Blowers [illegible]~~

~~Inspect Model~~

~~Last [illegible] all [illegible] -~~

~~Harmony Limestone for Zinc~~

~~Build new [illegible] cleaner~~

~~gas screens -~~

Start new samples from Clipton

~~See [illegible] Par [illegible]~~

~~New Cruel Support [illegible] -~~

~~Dick -~~

~~Inspect [illegible] model -~~

~~Start new Pl heater -~~

How about 5th Roll 6 High -

~~Heater on [illegible] Ogden [illegible] plans~~

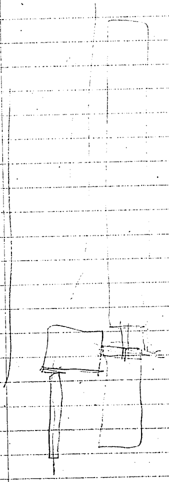
~~Get 4 table for Drafts~~

~~Close ocean [illegible]~~ —
~~Cincinnati Engines~~ [illegible] —
Get Copy [illegible] —
[illegible] —
~~[illegible]~~ —
Baird and [illegible]
Dead Roast, [illegible] samples
for treatment with HCl [illegible] —
[illegible] —
~~[illegible]~~ —
Make [illegible] for Laboratory
Freddy Cut samples from every
Core separate & assay separately
here & [illegible]
See [illegible] & 36 [illegible]
drawings
500 Volt Dynamos — #

213	batt	2348	973	64.78	✓
217	"	1979	1282	66.72	✓
218	"	774	713	87.31	✓
219.	"	751	580	85.39	✓
227	Dol	✓			
228	Dal	✓			

Try oxdzg Cu plates
in Caustic soda
with addition of
NaCl NaBr NaI

NaCy or KCy –



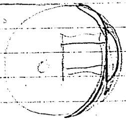
Vando wants
No 2 mailer right
away for Blacksmith
Shop

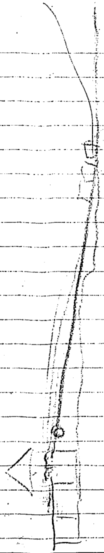
38" Lathe wanted
quick -

Dip in Drill Hole 1

23 to 27 ft	15
27 to 31	16
31 to 39	8
39 to 44	15
44 to 48	17
48 to 55	14
55 to 60	5
63 to 67	3
60 to 62 ?	15
66 to 70	4
70	14
77	24
84	5
93	16
93 Bottom	11
97	5
" top	10
102	4
" bottom	15

8'26 from Newark —





11 1111

1111

111

11

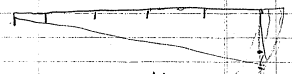
11 1111 11 1111 1111 11 11

1111 111 1111 14

1111 11

53 22

43 — 12



450
12
900
450
5400

43) 54
43
116

125

Trench 138 to 212

2 to 5 ft	340	146	92 58
6 @ 10	294	153	92 46
12 @ 15	315	176	93 65
21 @ 31 not exposed			
32 @ 35	809	399	82 68
36 @ 40	1300	523	76 96
41 @ 45	599	302	87 17
46 @ 50	341	245	89 49

Outcrop 60 ft W of 241
pure Quartz!

(69)

Limestone Contact Trench Fritz gully
Trench 214 to 215

from Dal		Feal	
9 to 10	934	316	86.02
11 to 15	507	119 → 54	91 84
16 to 20	714	3.40	89 03
21 to 25	250	.80 .50	94 50
26 to 30	2.71	.72 .47	94 44
31 to 35	200	.75 .38	93 53
41 to 45	544	530	88 87
46 to 50	10.26	540	79 18
56 to 60	693	552	88 02
61 to 65	1010	575	82 80
66 to 70	400	450	91 19
81 to 85	1553	405 — 142	75 48
86 to 90	1060	326 142	81 71
91 to 95	1345	725	78 17
96 to 100	1609	506 180	73 05
101 to 105	1574	673	73 33
106 to 110	1619	975	72 09
111 to 115	1472	556 169	73 46
116 to 119	6.16	663	87 09

graveyard going to Howardsville

near road

225
226
232
227
228
229

750 ft abt

Cline — on Drill Line —

near Dal

201

202

233

203
230
231

500 ft abt

77

16) 1 470 000 000 / 91 875 ...
144
30
140
128
112

91 800 000

600—

2,000
300

375,000

75) 2,000,00 (26
150
500

187.50) 375000 (2

760

Notebook, PN-00-10-17

This pocket notebook contains dated entries from May and October 1900. Some of the May dates have been changed to October. The pages consist of blank forms printed for use at the New Jersey and Pennsylvania Concentrating Works at Ogden, New Jersey. The entries, all of them by Edison, appear on the back of the forms. Many relate to battery experiments, including cadmium and other electrodes to be tried and various electrolyte solutions to test. Among the other tasks mentioned are the supervision of construction at the Edison Portland Cement Co. plant and consultations with Walter S. Mallory and other employees. Also included are lists of books to order and phonograph experiments to perform. The pages are unnumbered. Approximately 20 pages have been used.

Oct 17 1900 -

Try Ni pocket with CdO - reduce + plot curve use plenty Copper Then discharge on 4/5 External res - note volts + ampere - after dropping to 40 - reversed for 2 minutes with Current equal to discharging Current + note drop + Keep doing this until gone = Theory Either bad Contacts or paucity of Na anions internally -

~~Bad~~
Make some black oxide of silver + reduce by Hydrogen also Carbonate or chloride silver + then mould a plate + see if Can oxidize by heat if not by Current if OK try it with Cd pocket as a depolarizer

Oct 17 1900 -

Press some Copper plates just as light as they will handle then Ox by heat perhaps the trouble is in the Copper (ie) full Volts & not in Cadmium - perhaps Cu_4O is one formed & it needs double the Copper we have

Test this thus

~~Ni Pocket packed with Cadm~~

Cadmium plate full size latest mould also Copper plate which has been reduced & oxdzd to Cu_2O - discharge till Volts go to 36 - Then have another Cu plate & put it in & see if Volts goes up

Oct 17 1900

Try the Experiment with Cad plate & Cu plate with 10% Soda + 10% Sulphate soda

ditto

Chloride Soda instead see if the ~~free~~ alkali dont prevent action of acid on either plate & note if resistance is lowered—

also phos soda & Oxalate— would not the phos or Oxalate precip all impurities in alkaline solution

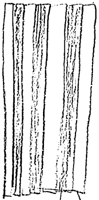
This might work with Zinc

~~Oct~~ Oct 17 1900

I noticed with the stick of Cd - that the oxide formed was apparently CdO may it not be possible that want of Contact is the whole trouble with the Cd results if so we shall have to have thinner plates with Ni filaments through them - or mixed ni wires with Cd plated on & pressed in moved to solidify —

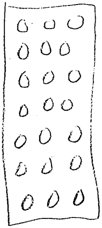
May 17 1900

To get contrast with Cd -



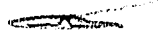
Ni 002 perforated

Cd plate .010 or 015
also perforated perforations
1/16
Then clamped to grid



May 17 1900

Try plating on Magnesium with Straight strips with Copper same size on both sides 1/4 inch apart perforate magnesium plate well with holes having sharp edges see if can stop plating so much on Edges round the edges of Copper & also Magnesium — If that dont do it bore holes in Copper also — If that dont do it groove Copper in center —



If that fails put rubber on Edges Magnesium — if that fails then

Oct 17 1900

~~then try an ... a.c.~~
~~or current~~ c

Make Magnesium ...

to make ... Edges

Try a dead clean polished
magnesium plate (no oil)

~~[illegible]~~ Oct 19 1900

Dont fail to try mixture of Spongy nickel & peroxide of Barium — May have to use 20% NaOH saturated with BaOH - so peroxide wont dissolve — use Cd or Zinc to get voltage of Zn use Zn NaOH — with Saturated BaOH —

Try 2 lead pocket with spongy ~~one [illegible] with [illegible] NaOH. Saturated lead [illegible]~~ ~~[illegible] Ox lead [illegible]~~ litharge with [illegible] in both & NaOH saturated with leadoxide —

Oct 17 1900 -

Oxdyze some of the spongy Copper then mould plate of dentwork - mix some NaOH strong to dampen & reoxidyze or strong NH_3 - This will make plate more porous

Permanganate of Copper may be used & be a depolarizer or some other permangonate thats insoluble in alkaline sol & packed in grid or moulded —

Oct 17 1900 –

Chl Zinc Zinc plate –

Ca OH plate or in pocket,

— Carbon holder –

Chlorine forms Hypochlorite

which is powerful

depolarizer – perhaps

Can get better grid –

Oct 18 =

Make some plates of reduced Copper & then put in H & heat again try in battery

also oxidize & reduce back by H & try =

Mount a plate of Cadmium & 2 plates Copper which has been reduced by Current & reoxidized by Current — & ~~test~~ reverse when 1/8 inch apart Cd in middle by halving amperes
Try 10 ~~&~~ 15 20 & 25% NaOH KOH LiOH, also with 15%

of cobalt solution adding
say 10% of Sulphate of
the alkali — Chloride —
Phosphate, Oxalate, Fluoride,
Tungstate, Molybdate,
Citrate, Tartrate, Borate
etc —

Covering Electrodes –

Membranes – of ferrocyanide of Copper – ditto Zinc —

Tannates —

Collodion – Shellac, Gutta percha – Syrian Asphalt, ~~Wax~~ Ceresine,

Nernst 3440 – Conductivity very slightly changed of salts in a) Colloid – (10) Conductivity only slightly changed by gelatinization of the solution –

Starch, Silicic acid, ferric hydroxide Aluminium sulphide – Cupric Sulphide K Tartrate Fe Tartrate ag Tartrate Tungstic acid Molybdic arsenic acid Tannin Glycogen Inulin, Dextrin Albumin

While not included be speaker in

same solution of Aluminum Hydroxide

= How about K Soap – Rosin K Soap

[illegible] or Na Soap –

Caromel [illegible] Schaelisonia –

again again –

Heavy Dry cells battery for transportation

can be [illegible] –

Start in Monday night with Simpkins
& go from 1 end to other on Cement
see what's been ordered, what drawings
done & what is to be done — Have
Complete list made out Tuesday &
Wednesday in a book for my infor

~~See about [illegible] [illegible] [illegible] Stables~~

See Mallory — ~~[illegible]~~
~~Specif~~ — ~~(B[illegible])~~ — ~~Pole & Sect~~

~~See about [illegible] [illegible] [illegible]~~

Vose about Carpenter ~~[illegible]~~
~~[illegible]~~

Dougan about Home Phone

~~Simpkins and 45 ft [illegible]~~ Rubble
~~order~~ ~~Motor~~ ~~Tell S have order~~
~~Motor from mine for [illegible] [illegible]~~

~~S about old stuff [illegible] Heating~~

~~S also about [illegible] under all~~
~~House, Motor [illegible] Cement [illegible]~~
~~ahead~~

~~See Dan [illegible]~~
~~[illegible] — also S [illegible]~~
~~[illegible]~~
~~[illegible]~~

~~S about [illegible]~~
~~& Tail Stuff [illegible]~~
~~& Auto [illegible]~~

also about Stand and Crowning
of idler & Head & T pulleys

D & S about Steam piping
S about design Elevator
& 3 H Rolls — Model screen
~~See [illegible] Blower House~~

~~Col Fried on Coal House Export~~

ditto Corcoran fired on Boilers

~~Col [illegible]~~
~~[illegible]~~

~~S about arranging Xtra Conveyors &~~
~~[illegible]~~
~~[illegible]~~
~~[illegible]~~
~~[illegible]~~ —

~~Calloused [illegible] pipe joints~~

~~Sloggs Bait~~ —

Get Muirs Elements of
Thermochemistry 1885 —

~~precipitate Hg2O + Dry~~
~~then take best lampblack~~
~~mix Hg2O with Lampblack~~
~~Say 2/3rds Lampblack 1/3~~
~~Hg2O by bulk then~~
~~mix Coaltar~~

Make some Carbon plates
of Lampblack with
Smallest amount Coal tar
pitch + Coal Tar say 25%
by wt + mould with
heavy pressure & bake
in muffle afterwards
bring up to high heat in
furnace up stairs. —

Oct 24 1900

use these porous Carbon plates to absorb salts

Try Concentrated Nitrate Hg. then dry + soak again until get all can in — then dip in KOH to precip Hg_2O in Carbon use as depolarizer also test all the metals this way as depolarizer

KOH doesn't remake

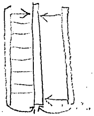
Cy from HgCy — ?

(Mendelejeff.) —

Chromic hydroxide, easily

Oxydized

[THIS BOOK WAS USED IN BOTH DIRECTIONS. THE FOLLOWING PAGES WERE FILMED FROM THE BACK END FORWARD.]



Tom Search single

left wo 3 H 8 and couldnt

wk dust - count in

neighborhood -

Dick Norman (Warren)

3 children - wkd 13 $\frac{1}{2}$

Notebook, PN-00-01-01

This undated pocket notebook was used by Edison, probably in 1901. It may have been carried on his surveying trip to the Sudbury region of Ontario during that year. It contains a record of ore samples obtained and properties seen or discussed. The entries indicate the location and accessibility of mines, their owners, and property values. Other notes list possible sources of nickel elsewhere in Canada and the United States, often giving names and addresses of mining companies and other suppliers. Scattered pages contain notes regarding experiments on briquetting, battery plates and electrolytes, and other matters. Included are two pages with the heading "new force," which describe experiments to be performed with a Marconi device, electromotograph, and chalk telephone. The inside back cover contains notations by an unidentified person. The pages are unnumbered. Approximately 45 pages have been used.

Briquetting -

Try clay minimum quantity make good brick - also right consistency for briquetting - Bake at different temp -

Try clay mixed with slaked lime - different proportions, baking & consistency idea being decomp of Si Al forming Silicate lime at proper heat -

Try little H_2SO_3 for gelatinizing clay make brick.

Try Stewartsville chalk & bake full red to clinker -

Clergues Enterprise
financed Phila —
E B V Douglas
Broker Phila
financing —

A Sudbury mining man
has lot property not his
own but for sale through
him —
Sudbury J R Gordon CE

Mr Lockerbie is Vice presdt
of Dominion Mineral Co
Montreal—

Lockerby property -
Worthington Station
Station Agt will tell
where Mr John Dwyer
is working 1½ m East
of Station
Lot 9 3rd sec
Denison whole of
Lot 10
Lot 11 in 3rd sec
owns 1/2 of 11 —
owns 1/2 of lot
1 of 5 sec

1/2 of 1 of 2 in
5 Concession

Rig up for small crucible melt of high mp alloys to obtain one for high temp for letting down heat in new Thermo Expmt,

See if alloys have come from DeHaën –

Try thin layer of powdered tungstate Calcium – ditto fluor spar ditto apatite between plates & test on Thermo using Sensitive galvanometer also test with higher heat up to 350 @ 500.
ditto Tourmaline, be sure use sensitive gal if get any deflection its a discovery

Better instrument wanted
than dip needle - especially
for determining depth + quantity
ore -
Suggest 1st Coarse coil +
over this fine coil - a single
Cell + make + break - normal
Earth magnetism not enough
to make Sound in telephone
when coil rests on ground
over pyrrhotite it acts as a
magnet Core for induction
Coil -
Needle apparently
only measures direction
of lines - want Inst to
measure intensity
Magnetometer too slow -
Cutting lines + reading
on a Weston Voltmeter
might answer - over

The speed could be governed
+ which wire commutated -

Reduce ~~Tungstic~~
Titanic - Tungstic or
Molybdic acid by H at
dull red - rather lamp
Req up a Easily manipulated
small reducing apparatus
so this class of expts can
be made easily -

Great Lakes Mng Co
Room No 9 Huron
Block
ask
A. J. L Efebre
agent

Try plating Zinc from alkali onto strongly oxdzd nickel plate also Iron scale or Melted magnetite See if any local action —

Try Magnesium plate & Zinc plated on with Nickel Electrode CP ZnO & CP KOH, closed cell — use strong Current to plate with —

Try Zinc rod in Homeopathic vial like cell to see if new organic alkali dissolve also Nickel NiO_2 — test Ni_2O_3 in Solution & ZnOH as well before testing Electrically

Township of Brunel
South of Fairy
Lake on GTR
bet North Bay &
Toronto —
Find Geo Paget
Huntsville Station
Hedstrom Mine
owned by
John Hedstrom

John Custer &
Paget — Paget
Mining ~~Co~~ —

Crush Canadian C Co pyrotite to 200 mesh — wash & sep in as many kinds possible, then assay

When down to Stewardsville investigate Cobalt Nodules —

Canadian Electric Chemical Co.
Sault Saint Mary
Ontario

Rhodium CP
Chlorine free KOH

$15000. Blacks offers
"This -
Lot 8 Con V Lorne
N W $\frac{1}{4}$ =

Teaming - 2.25 per
day per pair horses
& driver & we grub
driver & team
on Sled will haul
2 ton - Can get into
North Range 15 miles
from CPR
farmers in Cambrian
Land have nothing to
do in winter -
Govt will spend
equal amounts on a
public Road -

Holland & Reeves Buffalo
have lumber road in
which they are repairing
now - runs close to
mines -

McCormick [illegible]
left [illegible]
[illegible] 25 c
100 feet [illegible]
via Road to
N Range [illegible]
[illegible]

Canadian Mining
Review - Ottawa
Monthly Bell Editor
Subscribe

Levick Township

3 Mines owned by Tongh
& Stobie — near
Blacks Mine —

They have asked
for 3 mines —

300000 Cash
or 100 000 " & 25c Ton Ry

They might take a minimum
guarantee of 100 tons
daily at 50c ton &
20000 Cash with
guarantee of a 50000
Mill —
Above prices they say
Can be shaded much
[illegible] water power, [illegible]

is included

Black which is next
to them wants 40 000
Cash for 2 mines
will take some Cash
& some in Mortgage —

~~[illegible]~~

Black has other mines
near these the group
he wants $100,000 for —
but will split group
as above, & sell 2
for 40 000.

Worthington mine I think is
a Shute, about 125 ft
at outcrop — I took sample
every 6" across a Cross
Cut, sent to Orange — The big
samples are from bottom
of shaft & picked sample
in Cut showed [illegible] was
several irregular stringers
of [illegible] ore [illegible] across
Cut of say 30 @ 40 inches
Its the diorite Conglomerate
Contact & ore occurs as
Connecting stringers bet.
boulders of diorite &
Talc → 125 @ 150

Schaefer Alkaloid works
Maywood N.J.

Roessler & Hasslacher are
Evidently headqrs for Barium
Compounds.

Castner Electrolytic Alkali
Niagara Falls Agts
Arnold Hoffman Co
32 Broadway, make fine
pearly Caustic NaOH, also
31 Baumee liquid purer, –
get prices for lehande or Cylinders

A W Miller Supt Oregon Mineral
Exhibit Box 18 Fremont P.O.
Portland Oregon – gave me
the samples of Riddles Ni

Newly discovered Nickel mine
in Serpentine Washington
Northwest Consolidated Mining
Co 2905 Hewitt ave
Everett, Washington,

Nicholas Rudebeck
3210½ Everett ave
Everett Washington – this
man had charge Washn
Exhibit at Buffalo, gave me
sample – says lots of Ni in
Serpentine in Washn – will
locate some or correspond

Riddles main deposit owned by
International Nickel Co, formerly
had offices in Chicago
they have a man in charge at
Riddles, are in litigation.

have considerable buildings &
machinery - reported Rothschild
bot up control & closed mine

South of Riddles another mine
Thos Prater presdt Oakland Cal.

5 m SW Riddles Douglas Co
American Nickel mine office
Chicago J H Winslow presdt
Glencoe Illinois - This may be
same man who bot & sent Samp[illegible]

N Hummel Editor Wadsworth
Despatch Wadsworth Nevada
Can give me information about
Cottonwood Canyon Nickel mines

Rossland - Snowshoe mines
A. J. McMillan Rossland
He is manager The Co is
The British Columbia (Rossland
& Slocan) Syndicate (Ltd) —
Rossland B.C. So going
send another Bbl - ore) fst

Thos W Gibson
Director Ontario
Bureau Mines
Toronto

Leased } Mining laws
lands $1 per
acre 1st year $1 per
15 @ 30 2nd year &
bot at 3.50

Sudbury Mines
Howland Mine Canadian
Nickel Co Worthington
Totten Mine "

Canadian Cop Co Mine [illegible]
[illegible]
[illegible]

Strathcona property
[illegible] Tp
J F Black Sudbury

Burkes Falls, H McVeetie
Parry Sound district

Chapman Tp
Parry Sound Dist
John Schuler

Neil Martin
Winnepeg Manitba
Hawk Lodge near
Ingolf Station
CPR Rainy River
Dist

[illegible] Mine)
Victoria Mine —

[illegible]ckel Copper Co
Worthington Mine
[illegible] Hamilton
[illegible]tario —

North Worthington Mine
Algoma — A. Robinson
Ottawa —

Little Turtle
Creek Lower
Seine Region —
Contributed by
Bureau Mines

M. Ryan Kearney
Locality Lot 32
Con 13 Tp. Perry

Coulter, J Bowman
Mocassin propy
near Rossport N
Shore Lake Sup

Nickel Lake location
Rainy Lake

Coulter
O O'Connor
Sudbury
Net Lake near
Lake Temagami

Ontario Graphite Co
Big exhibit graphite
write them
Ottawa Canada

Carlbr
Bureau Mines
Split rock rapids
Missanabie Ross,

another ~~[illegible]~~
Crown Land at
Massey —

I M Allen
Colorado Spgs Col
Box 810 —
Invested in Riddle's
Original Nickel
discovy =
at following
[illegible] =
Internatl Ni Co squeezed
out - Now Americn
Ni Mng Co

J R Ashley Yacht
J McCormick ?
as far as Allen
knows —
Retired Banker who
man sold out to
~~trust~~ Rock —
he & few others
own it —
Over $13,000 —
for an outlay

they acquired —
have 285 acres
all patented —
Have a Mortgage
Allen will find out
& write me Oran per

Largest body of Serpentine
containing Chrome is in
Eastern Township Quebec
South End at Ham extends
or 15 miles to Wolfestown
Serp. is 1 to 3 miles wide —

Nickel
Oregon — 3 localities
Riddles 4 m from it
"Piney" or Nickel Mountain
on upper Dodo Creek
in Douglas Co & near
Rock Point in Jackson
Co last 2 places
Deposits & Caleoo —
12% Ni 2.5% Co
no work done Either locality

Sudbury dist
Township Creighton
Water power 2500
HP — Owned by
McPherson & Gordon
14 miles fm S

Water power Dill
Township 4000 HP
F Cochran Harrison
Mcht. Sudbury
9 miles fm Sud
owner

D O'Connor
His wife Kept Edison Hotel
Schenectady

Algoma Ni Co
owned by Jack
Cushing Bro of
Mike C–
Connor owns
15000 stock

O'Connor owns
10 & 11 in 1st & 2nd
of Nairn – Nickel

2 bodies – Holds it

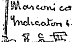
at $5000
20 ft fall 2 miles
away on Spanish –
thinks may be 100 HP

Algoma Ni Co near
Nairn in Lorne Lot 11 Con 5th
Conesis RR track
Runs right thro it
[illegible]

fall within a Mile
20 ft owned by
McIntyre Bros
O'Connor 2 yrs
ago off'd 1500
wldnt take it —
O'Connor sold it to
them for 15000 —

O'Connor says see
John Dwyer he knows
all about the Country —
Dwyer lives at Worthington

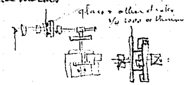
New force
Marconi coherer, 20 metals,
Indicator by fluorescence single crystal


use about 20 different metals
for rods

Electromotograph with Mirror Reg chalk
also telephonic —
Make Cylinders of Carbonates Phosphates
Arsenates Oxalates Tungstates,
Molybdates, Chromates, Fluorides
+ oxides of Ba Sr Ca Mg Al Zn
Sn Sb Ag Ni Co Fe Mn. Bi Sb Cu
Ur Th Hg Cd Be also amorp Silica
Use for rubbing metals principally Pt
but try Mg Al Zn Cu. Pb Sn Bi Sb Ag
Au. Ir Pd Fe Co Ni Si. Brass
Manganin & other alloys German Silver

Dark box with grafite electrodes
also pencils of metals in powder Red
by Hydrogen —

Telephone Detector spools of wire made of Cd Zn Cu Fe Ni Co lead Al Silver Brass Ag Pt German Silver Manganin Etc — Also removable Cores of all metals also diaphragms of all metals —



On North 1/2 of 3
first Con —

O Connor at Sudbury
Says Immense bodies
pyrrhotite Carrying
1 & 1 1/4 % in Township
Moncrieff right near
CPRR —

J A Proctor Toronto
Telegm says property
Lands North 1/2 Lots
1 2 3 4 first Conc
South 1/2 Same lots in 2nd
Conc Hyman developments

D Jacobs & Co
Where we bot
Wigwam shoes
[illegible]

at Worthington [illegible]

Cop Ni Co [illegible] 1/2 mile
station Worthington
mine of [illegible] owned
by [illegible]
Col [illegible] —
Next one NE is Hiram
~~Roberts~~ Robinson Ottawa
wanted 30000 yrs ago wants
more now — Dwyer says good
showing - High grade —
after this O Connor at Sudbury
offered it once to Dwyer at
$6000 =

in Drury NE part lot 6
3rd Conc & NW part lot
5 3rd Conc
owned J B Miller Soo St Marys
Ontario 2% [illegible]

Dwyer had option on it
for 5000, & didn't buy it
says can get it again by
Welsh – I said we'd guar
600 if suited

Send Miller some
glasses for
needles

---

also spring brass
clips to act as
stops on needles –

Sultana Mine 7 miles
from Worthington,
good road – owned by
Chicago parties 2 million
Capital – 4 shafts, –
stopped work – parties
came on from Chicago
last week had it
pumped –

Chicago Mining
& Milling Co a fraud
as mined only leased
from owners & didn't
own it =

<u>Ross Mine</u> 5% Cu
3.1% Ni North
Range - 15 m fm
CPR - Foy Township
Wants $25000.
Ryan has it for sale
Will find out amount
of Land Ross Mine
is patented =
Foy WR5 - 75 acres
WR6 - 31 acres

Prospector named
Drew saw me just
as was leaving for
home said he had
found Ni gossan in
Trill - 100 ft wide
traceable [illegible]
He was hard up
said for $200 he would
let me take it I
wrote letter to [illegible]
to see it + if OK
apply for it [illegible]
Drew $25 - [illegible]

to pay balance
175 + allow a
small royalty
to be determined by
me — He is to find
Miller & Indiana
the letter told
John Take Clanach
& go see it =

2

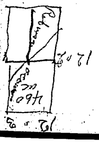
No E Pa Lot 6 " 3

No W 2 5 " 3

Mrs L B Mullen

Soo st Marie

Ont



Notebook, PN-02-01-02

This pocket notebook consists of a promotional calendar printed for distribution by the Vulcan Iron Works Co. Three pages from January 1902 were used by Edison for notes regarding battery experiments to be performed, as well as a briquetting experiment. Most of the proposed battery experiments involve the use of various electrolyte solutions. The front cover is stamped "1902 The Vulcan Iron Works Company, Toledo, Ohio, Manufacturers Steam Shovels, Elevator and Dipper Dredges, also Boiler Fronts."

YEARLY CALENDAR, 1902.

JANUARY—1902.

S	M	T	W	T	F	S
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

FEBRUARY—1902.

S	M	T	W	T	F	S
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	..
..	..	..	..	..	..	..

MARCH—1902.

S	M	T	W	T	F	S
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	..	..	..	..	..

APRIL—1902.

S	M	T	W	T	F	S
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	..	..	..

MAY—1902.

S	M	T	W	T	F	S
..	..	..	..	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
..	..	..	..	..	..	..

JUNE—1902.

S	M	T	W	T	F	S
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	..	..	..	..	..

JULY—1902.

S	M	T	W	T	F	S
..	..	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	..	..

AUGUST—1902.

S	M	T	W	T	F	S
..	..	..	..	..	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	..	..	..	..	..	..

SEPTEMBER—1902.

S	M	T	W	T	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	..	..	..	..
..	..	..	..	..	..	..

OCTOBER—1902

S	M	T	W	T	F	S
..	..	..	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	..

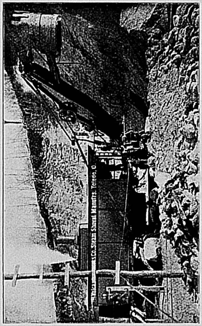
NOVEMBER—1902.

S	M	T	W	T	F	S
..	..	..	..	..	..	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	..	..	..	..	..	..

DECEMBER—1902.

S	M	T	W	T	F	S
..	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31	..	..	..

Shovel working in large cement plant on Long Island, handling cement rock and hard earth, mixed with large bowlders.



75-TON "BOOM" STEAM SHOVEL.

Shovel is required to hoist all material up into high hoppers, from which it is carried away.

JANUARY. 1902.

31 DAYS.

SUN.

MON.

TUES.

WED. 1

NEW YEAR'S DAY.

THUR. 2

10 grids 35% KOH,
10 " 10%
10 " 20% 1 part BaOH.
10 " Fe best 20KOH 1 [illegible]

FRI. 3

BaOH,
10 grids Swift Fe 35% KOH.
10 " " 20% KOH

SAT. 4

10 grids 20% KOH [illegible]
10 Ni grids 20% KOH
1 part StrontiaOH.

JANUARY. 1902.

10 Ni graphite,

SUN. 5

10 Ni 9 To 1
10 7 To 3
10 6 to 4
10 5 To 5
10 4 Ni to 6 graf

20 KOH,

Sunday after New Year.

MON. 6

What Causes of all these to are value of drop of Voltage,

Epiphany.

TUES. 7

10 Ni 20% KOH, 1 part NH4
10 best Fe " "

WED. 8

10 Ni in nearly saturated Sol of BaOH,

THUR. 9

10 best Iron 892
10 " Nagraf –
To test best average Voltage

FRI. 10

JWA should make a barrel of CP Oxalate,

SAT. 11

Try changing repair at Constant Voltage.

31 DAYS. JANUARY. 1902.

SUN. 12 (12) Try hard pitch powder for briquettes =

1st Sunday after Epiphany.

MON. 13 (13) Carb Lime & Calcium Chloride in equal equivalents. melt at red heat in a clear homogeneous

TUES. 14 (14) [illegible] - Try bkg

WED. 15 (15)

THUR. 16 (16)

FRI. 17 (17)

SAT. 18 (18)

31 DAYS. JANUARY. 1902.

SUN. 19 (19)

2d Sunday after Epiphany.

MON. 20 (20)

TUES. 21 (21)

WED. 22 (22)

THUR. 23 (23)

FRI. 24 (24)

SAT. 25 (25)

Notebook, PN-03-02-10

The one dated entry in this pocket notebook is from February 1903. All entries are by Edison. The book contains notes and drawings pertaining to experiments to be performed, including work on batteries, electric meters, lighting, and x-ray apparatus. Among the employees mentioned in relation to individual experiments are Cloyd M. Chapman, Frederick P. Ott, John F. Ott, and Charles N. or Albert F. Wurth. The pages are unnumbered. Approximately 20 pages have been used.

1 ~~John Ott about waiting week for meter hinges Keeping back boards~~

~~2 Norway Iron for meters~~

~~3rd Write Cadmium flask~~

~~4= about Nickel syndicate~~

1 = John abt Norway Core for meter -

2nd Boy for Fred Ott for Chalks

3rd Board for holding Chalks

5 = Small holder for Chalks fitted to Motograph for testing, Ear tubes

6" Call try about making the 2" Extra arc furnaces melted John Ott -

7 Give list of stuff to Chapman —

Note, Sydenham Tungstate is isomorphous with Scheelite, prob good for fluoroscope Try

Try Titanic acid with Lampblack press in button then pack in charcoal & reduce in flame —

also above with Ni Co & Fe to make alloy of Titanium

Try Chromic oxide & Ni Metal with charcoal see how works

find out of Electrical Coal
order from DeHaen [illegible]
alloys come & what are
are they —

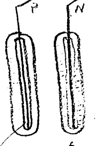
Put alloys & cases also
old thermo alloys up
Stairs in Library

Feby 10 1903

Concentration storage battery
KOH, say 30% solution,
finely divided. Magnesia ignited &
graphite both poles, charge one
pole Conc KOH other pole weak
KOH, by using very thick
pockets. Ni Fe ought get
strong Current —

I think that possibly a sub
for $Ni(OH)_2$ in baty - by using
Compound oxides, Cr & Fe
Mn Fe   WO Fe   WO Mn
Cr Mn   Cr WO   Cr Mo
Ni WO   Ni Fe   Ni Mn   Ni WO
Ni Cr, Fe Ce   Ce WO   Ce Cr
all hydroxides precip together
or as oxalates

Concentration cell might be made with Ni plates faced with a porous non Conductor.



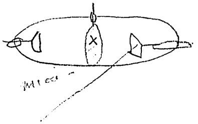
Space or not.

possibly in 28 plate cell. 4 or 500 plates could be put in + Coated with porous material + give good Capacity –

possibly 400 plates can be put in cell + ~~all~~ plates provided with separator + then porous material packed in with gas vents the porous material making one mass,
Carb ~~[illegible]~~ Strontium phosph ammon
Conc KOH, possibly plaster
Paris Chloro Mag - portland Cement
+ other setting porous material
Ph 280 Zinc etc –
2000 plates 10/1000 thick,
10/1000 porous stuff 1/4 of plates
280 lbs put in 5 Cells in series
1 Volt, 200 watts.
Each cell EMF ·2 Volt.
Zn Cd + Mg form peroxides
Try Cd + Mg hydroxides 6+4
grafite in KOH —

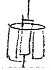
By fusion process tungstates
with WO_3 Na Compounds are
formed —
Per Ox Co by heating
Cupric OH_2 in KOH,

If we are to consider a
Solvent like water a Vacuum
+ X ray only given after
Vac reaches certain state
+ ceases beyond then a
Celluloid Cell with Pt
Electrodes + very few ions
should get X or some
Kind of ray from one
plat Electrode —



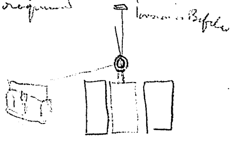
as X is said to throw a
shadow like Crookes
Cross, will it give X
rays first, then X ray
is due to strikes of atoms
on inertia matter of high
temp ray proceeds from it

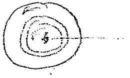
Positive pole current seems
to Carry matter with it in
same direction. Therefore



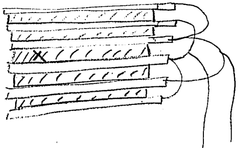
Torsion pass Ct
through coat it

ought to twist a cylinder inside Coil in same direction as current. perhaps only momentary may be continuous twist, possibly very delicate suspension & heavy current required

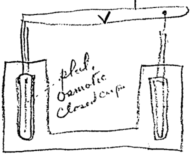




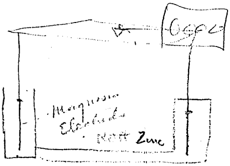
Condenser



X pressed Carb Strontia wet KOH Nickel sheet, Kept under pressure with clamp or weight.

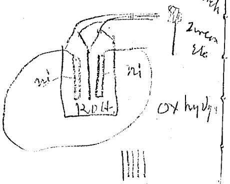


Meter

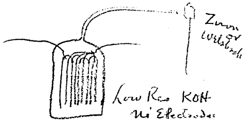


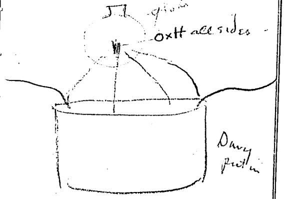
Zinc solution in KOH

Meter -



or





House Lighting

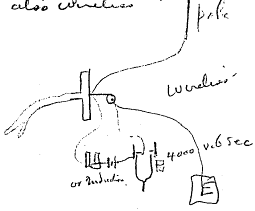
Static → porous stuff —

will static current drag it —

Why with Chem Telegh Recording pen is + always lengthening while — always shortening possibly Radical change
Coke + clean [illegible] after Ct opens
Did I write of Solutions in big book for Chem Recording —

pen side more press than other

Use Motograph + very high pitch vibrating fork + get continuous sound ~~[illegible]~~ fork to be in a Ckt of great static Cap Cable artificial — ece of signals Easy — also Wireless

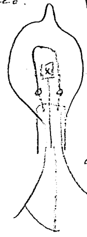


Try feasible metals in Phono Record Moulds ~~of [illegible] slow~~

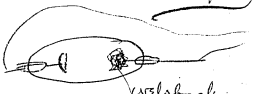
[illegible] - Cements put
in phono record moved
might control by drying
& Come out, —

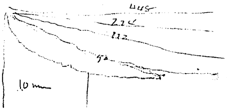
Plaster Paris,
Phos Zinc
Chl & Ox Mag
ditto Chl & Ox Zn
Gelatin with browning
Sugar,
Gum Dextrin
~~[illegible]~~ Very hard Coaltar pitch

Possibly some of less
Volatile Camphors might
work as Recording cylinder
if pressed.



possibly
by very high
Exhaustion
get X ray
on X
when lamp
lighted





28

Notebook, PN-03-10-06

This pocket notebook consists of a diary for 1902. It was used by Edison during October 1903, September-November 1905, January 1906, and possibly at other times for notes and drawings regarding experimental work and other tasks to be performed at the laboratory. There are numerous proposed experiments relating to the chemical composition of components for Edison's alkaline storage battery, along with others pertaining to the location, assay, refinement, and use of nickel and cobalt ores. Some of the entries identify various groups of test cells, while others list experiments involving ores from the Darby mine in the Sudbury region of Ontario. There are also entries concerning phonographs, electromotographs, and operations at the Edison Portland Cement Co. plant. Among the many employees mentioned in relation to individual tasks are Jonas W. Aylsworth, Emil Herter, Walter E. Holland, Walter S. Mallory, and Peter Weber. In addition, there are some entries pertaining to business, clerical, and family matters. These include one note about sending money to the Edison children for Christmas and reminders about communications with Sigmund Bergmann, Frank L. Dyer, and William E. Gilmore. The front cover is stamped "Thomas A. Edison." Approximately 80 pages have been used.

PN-03-10-06

12-111
Shelf 1

Rowland article 149
103 W 55th St

HELP IN CASE OF ACCIDENTS

DROWNING.—1. Loosen clothing, if any. 2. Empty lungs of water by laying body on its stomach, and lifting it by the middle so that the head hangs down. Jerk the body a few times. 3. Pull tongue forward, using handkerchief, or pin with string, if necessary. 4. Imitate motion of respiration by alternately compressing and expanding the lower ribs, about twenty times a minute. Alternately raising and lowering the arms from the sides up above the head will stimulate the action of the lungs. Let it be done gently but persistently. 5. Apply warmth and friction to extremities. 6. By holding tongue forward, closing the nostrils, and pressing the "Adam's apple" back (so as to close entrance to stomach), direct inflation may be tried. Take a deep breath and breathe it forcibly into the mouth of patient, compress the chest to expel the air, and repeat the operation. 7. DON'T GIVE UP! People have been saved after HOURS of patient, vigorous effort. 8. When breathing begins, get patient into a warm bed, give WARM drinks, or spirits in teaspoonfuls, fresh air, and quiet.

SUNSTROKE.—There are two important indications for treatment—reduction of temperature and the use of stimulants. The patient should first be removed to a cooler spot if possible, or at least where shade can be secured. The treatment should be begun at once. The clothing about the neck and body must be either loosened or removed. Cold is particularly indicated in cases where there is great heat of the body, and delirium and convulsive movements are present. This means of reducing the temperature may be applied in the shape of cracked ice about the head and spine, or the use of cold water. If the heat of the body is very great, it may be necessary to wrap the patient in sheets wet with cold water. If there is, besides the great heat, evidence of serious depression, stimulants must be used while the cold is being applied.

BURNS AND SCALDS.—Cover with cooking soda, and lay wet cloths over it. Whites of eggs and olive oil. Olive oil or linseed oil, plain, or mixed with chalk or whiting. Sweet or olive oil and lime-water. Shock, which is always present in severe burns, requires the administration of stimulants. Pain is more constant and intense in burns than in any other form of injury, and requires sedatives, which should be administered by the medical attendant. Later on the appearances of inflammation and other complications are to be carefully watched for.

HÆMORRHAGE.—The usual treatment is rest in the recumbent position; small pieces of ice should be freely swallowed, and the application of ice wrapped in a towel, or in an ice-bag, or snow, cold water, etc., over the stomach; hot applications may be applied to the extremities.

FIRE IN A BUILDING.—Crawl on the floor. The clearest air is the lowest in the room. Cover head with woolen wrap, wet if possible. Cut holes for the eyes. *Don't get excited.*

Wea. WED. JAN. 1, 1902 Ther.

90% – 20% 150 – 75 [illegible]

602 - 495 87
630 450 [illegible]
607 482 89
612 498 90
607 482 90
725 528 125 * 75 Rate

* put on 35% by mistake for discharge.

Wea. THURSDAY 2 Ther.

7
~~[illegible] 983~~

Wea. FRI. JAN. 3, 1902 Ther.

988 - 35% 150 - 71 original

690	345	127
660	450	130
707	500	132
65[illegible]	455	132
6[illegible]	470	[illegible]
6[illegible]	[illegible]	13[illegible]
6[illegible]	[illegible]	13[illegible]
6[illegible]		

290

Wea. SATURDAY 4 Ther.

3 5

345
35
1725
1035
12075

Wea. SUN. JAN. 5, 1902 Ther.

988 - 20% [illegible] 75 original [illegible]

592	425	86
617	442	93
575	467	96
592	350	100
583	417	101
558	425	103
575 -	408 -	105
566	408 -	105
600 -	400 -	107

Wea. MONDAY 6 Ther.

958

Wea. TUES. JAN. 7, 1902 Ther.

Wea. WEDNESDAY 8 Ther.

First Run

Wea. THUR. JAN. 9, 1902 Ther.

75 Rake

77	1037	556	455	90	~~75~~ 90
76	1038	556	470		88
76	1039	571	488		87
76	1040	560	470		88
77	1041	531	425		87
76	1042	517	431		88

2nd

75 Rake

1037	586	488	90 - 99
1038	582	463	88 - 100
1039	588	505	88 - 96
1040			
1041	607	536	87 - 97
1042	536	450	94 98

Wea. FRIDAY 10 Ther.

Wea. WED. JAN. 15, 1902 Ther.

Wea. THURSDAY 16 Ther.

Wea. FRI. JAN. 17, 1902 Ther.

Write Malloy about
using Crucible steel
wire — for belt lacing

also about taking up
belts so often —
also support which
Cooler, chilled or
fine grain —

Wea. SATURDAY 18 Ther.

Wea. THUR. JAN. 23, 1902 Ther.

Wea. FRIDAY 24 Ther.

Grew

Wea. SAT. JAN. 25, 1902 Ther.

				und	Edge
100	1043	1280	1130	80	86
70	1044	1299 –	1177	80	86
67	1045	1118 –	996	81	89
70	1046	1195 –	1075	77	92
68	1047				
	1048				
	1049				

Wea. SUNDAY 26 Ther.

Wea. MON. JAN. 27, 1902 Ther.

[illegible] [illegible] Brunswick [illegible] to see [illegible] arrangement,

Wea. TUESDAY 28 Ther.

Wea. WED. JAN. 29, 1902 Ther.

Lost 1/2 Cups powder [illegible] def being [illegible] no 10% water in [illegible] dried dead dry [illegible] powder on [illegible]

1st Run 20% 75 rate

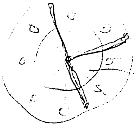
75	1063 —	579	492	86
80	1064 —	606	493	87
81	1065 —	608	493	87
76	1066 —	607	507	87
79	1067	592	487	87
80	1068	585	476	87

Wea. THURSDAY 30 Ther.

Wea. FRI. JAN. 31, 1902 Ther.

Wea. SAT. FEB. 1 Ther.

Wea. SUN. FEB. 2, 1902 Ther.



1 inch dia

New Recorder longer
wind lever say $1\frac{1}{2}$
longer [illegible] —

Wea. MONDAY 3 Ther.

Wea. TUES. FEB. 4, 1902 Ther.

Wea. WEDNESDAY 5 Ther.

Wea. ~~THUR.~~ ~~FEB. 6, 1902~~ Ther.

Oct 6 1903 —

Dip a reg black record in Kero with Chl Sulphur in NQ

also Kero with Bromine —

Try Hypo to harden surface

If Kerosene dissolves it, try

Bromine in H_2O. — Gasoline

and other solvents, ~~Cop~~ Nitric A

Conc — Vapors of Bromine

Devenald send all the

varities of asphalt.

If not many send for one pound

samples Trinidad purified

Wea. FRIDAY 7 Ther.

Hard & soft Carbon — Mexican

Utah Gilsonite, get some

Olivine pitch — peruvian pitch,

Hard Coal tar pitch,

~~Move Piano & everything up-~~

~~stairs up before the house~~

~~[illegible]~~

~~[illegible]~~

window — [illegible] Got for things

to go in safe Fred [illegible]

ditto upstairs Yale L

on

Wea. SAT. FEB. 8, 1902 Ther.

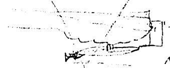
Wea. SUNDAY 9 Ther.

Wea. MON. ~~FEB. 10, 1902~~ Ther.

door — ~~work [illegible]~~

get the 6 balls from Lammey —

Try this — when room ready



tried — not good
wants to be regular

Double leverage — leverage

Wea. TUESDAY 11 Ther.

ask Heisler if Can't put [illegible]
on shaft [illegible]
instead [illegible] —
See Heisler abt [illegible] feeds
Coal Dryer —
Malloy what Kind of
[illegible] have we in Oil
System — [illegible]
[illegible]
worked [illegible]

Wea.	WED. FEB. 12, 1902	Ther.

Wea.	THURSDAY 13	Ther.

~~Wea. FRI. FEB. 14, 1902 Ther.~~

Try ignited charcoal that
will just conduct in KOH,
40% with a charged
Nickel sea if get current,
if not keep looking solution
primary battery —

~~Workbench in Museum room~~
~~annex~~ + tanks — put in
38" funnel exit hole - ditto
big funnel —

Wea.	SATURDAY 15	Ther.

Oct 8 1903

Henry Dyer [illegible]
~~Im[illegible] [illegible] Clark Cards~~ —
= ~~Heavy Block~~ - ~~Hamson~~
~~End of Blank~~ —

Claim combn of piston
Rods + neg leakage
Speak of first piston
Rods - in patent —

Wea. SUN. FEB. 16, 1902 Ther.

Wea. MONDAY 17 Ther.

Wea. TUES. FEB. 18, 1902 Ther.

possibly degree of elasticity
also measuring reg bearings
as sensibility of [illegible]
See Marvin's book on search
Trompas —

Combination piston with two
Chambers [illegible] both a
reg bearings

Combination of a Reamer
needing [illegible]
& Replace with [illegible]

Wea. WEDNESDAY 19 Ther.

bearings that the idea
of both [illegible]
have [illegible] movement
beyond the [illegible]

Patent filler — Independent

~~Have Pat Farmer's patent~~
~~[illegible]~~

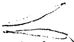
~~Mr Batting~~ 2 Nits 1 Iron
~~Rocket out~~ — 5 [illegible]

Wea. THUR. FEB. 20, 1902 Ther.

Wea. FRIDAY 21 Ther.

Oct 9 1903

Wea. SAT. ~~FEB. 22, 1902~~ Ther.



Trussed funnel —

hard glazed surface by painting get some hard pitch or try dip record, heat moved a little, also doping it with parafine — test seeing that record will stand —

Zyl Rub Co
Andover
Mass

~~Write the makers of the 005 Rubber [illegible]~~

Wea. SUNDAY 23 Ther.

~~get them make some 001 002 003 & 004 Rub [illegible] as special favor —~~

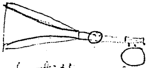
[illegible] take out new Dia on Telephone using Idea [illegible] copyright [illegible] [illegible] — also after test in foreign Countries —

Wea. MON. FEB. 24, 1902 Ther.

Wea. TUESDAY 25 Ther.

Wea. WED. FEB. 26, 1902 Ther.

Dyer in new piston patent with funnel like Recorder show funnel + all



patent the adjustable pressure foot + ball. Sapphire ball of a surface sufficient to prevent hurting the wax —

Wea. THURSDAY 27 Ther.

pressure arm claim the spring

See what new things can be patented by Miller & on Cotton

Patent double pitch so master will give a record which will act as master —

Wea. FRI. FEB. 28, 1902 Ther.

Wea. SAT. MARCH 1 Ther.

Wea. SUN. MARCH 2, 1902 Ther.

(Iowa to send Kapteyn
just what he wants, [illegible]
Ref. [illegible] XVIII,)

Wea. MONDAY 3 Ther.

Wea. TUES. MARCH 4, 1902 Ther.

Wea. WEDNESDAY 5 Ther.

Wea. THUR. MARCH 6, 1902 Ther.

Cobalt. Chatham Conn

Smaltite 1.35 / 3.82 Co

12.19 / 9.44 Ni

occurs in Mica slate,

Skutterudite As Co 20%

occurs in Hornblende

gangue in Gneiss in Norway

Cobaltite from 9 to 33%

Sulphur arsenic

occurs in Mica slate

in Sweden

Wea. FRIDAY 7 Ther.

Gersdorfite from 0.26

to 14% Co — 28% Ni —

S + As combn

occurs in decomposed

Blende & Galenite at

Phoenixville Pa —

Wea. SAT. MARCH 8, 1902 Ther.

Cobaltiferous [illegible]
[illegible]
at Mt Sorata Bolivia
also Inquisivi also at
La Paz + Yungas Bolivia
3 to 5% Co —

Alloclasite
Co 10 to 32%
S + As - Bi Hungary

Wea. SUNDAY 9 Ther.

[illegible]
S [illegible] —
Co from 0.83 to 3.14%
[illegible]

Wea. MON. MARCH 10, 1902 Ther.

Syepoorite.
S - Co -
64% Co
from Syepoor near Rajputana
India [illegible]
[illegible] with pyrrhotite —

Carrollite
Patapsco mine near
Finksburg Carroll Co Md
37% Co 1.5 Ni Sulphide
also at Springfield mine

Wea. TUESDAY 11 Ther.

Linnaeite, 43% Co found
in Chlorite Slate at
Mine La Motte & at Mineral
Hill Maryland with
Calcopy Blende Bornite
+ pyrite —

Wea. WED. MARCH 12, 1902 Ther.

Grunauite

S 38 Bi 14 Ni 40 a 22

Fe 5 Co 11% Cu 11% Pb 7.4

found with Quartz &

Chalcopyrite

Utah ore mined

in air, Treated

Chemical Reagents

by Mine La Motte Co partly

going to market

Wea. THURSDAY 13 Ther.

Glaucodot

As 43 S 20 Co 24%

Fe 12

occurs w. chlorite

slate with Cobaltite

in Province of Huasco

Chili

Wea. FRI. MARCH 14, 1902 Ther.

Alloclasite

S 16 As 32 Bi 30

Fe 5 Zn 2 - Co 25%

Hungary

Large deposits Wad at

Martinsburg Lewis Co NY

in swamp

Large deposits at Blue Hill

Wea. SATURDAY 15 Ther.

Bay, Dover, &

other places in Maine

Cobaltiferous Wad

found ~~at~~ near Silver Bluff

South Carolina

24% oxide Cobalt

& 70% MnO_2

Wea. SUN. MARCH 16, 1902 Ther.

Erythrite

As [illegible] 33%

[illegible] Fe 3%

Earthy Co [illegible]

[illegible]

[illegible] Arsenate [illegible]

Ni Co in [illegible]

[illegible]

[illegible]

As 44 Ni 20 Co 9%

Wea. MONDAY 17 Ther.

Cabrerite

As 42 Ni 20 Co 4

Mg 10

in Sierra Cabrera Spain

in gangue [illegible]

which is [illegible]

[illegible]

Results [illegible] alteration of

arsenides Ni + Co

Wea. TUES. MARCH 18, 1902 Ther.

Köttigite

As 37 Zn 30 Co 7 Ni 2.

occurs with smaltite in

Germany

Patronite

Molybdate of Cobalt

found in Uranium ore

in Joachimsthal

Wea. WEDNESDAY 19 Ther.

Dolomite - Cobaltiferous

Co [illegible] Reddish

Cuba

Przibram

Remingtonite

Rose colored incrustation

occurs in [illegible] this

veins of Serpentine

which traverse Hornblende +

Epidote, at Copper Mine near

Finksburg Maryland

Wea. THUR. MARCH 20, 1902 Ther.

Cosalite
Co 2 to 4%
with Cobaltite in a
Silver mine of Cosala
Province of Sinaloa
Mexico

Determination of Co 1 1/2 % Co
in Serpentine

Wea. Vol 64 Phil Mag FRIDAY 21 Ther.

IV XXXV 170

pages Ni is only common
in pyrrhotite while Co
is more common in
pyrite—look it up

Wea. SAT. MARCH 22, 1902 Ther.

Glaucopyrite
As 67 Sb 3.59 Fe 21
Co 4.6% Cu 1.14
found in mines of
Guadalcanal in
Andalusia Spain

Wea. SUNDAY 23 Ther.

Rabdionite
black soft grains
Fe 45 Mn 23
Al 2 Cu 14 Co 5%
Urals Russia

Wea. MON. MARCH 24, 1902 Ther.

Rhagite

Bi 73 As 14

Co 1.47% Ca 1/2

Rosalite

As 50 Co 13%

Ca. 21 Mg 4 H2O 13

Wea. TUESDAY 25 Ther.

Sphaerocobaltite

As 61 S 2 Co 15%

Calc 4% Fe 16

Wea. WED. MARCH 26, 1902 Ther.

Winklerite

As 11 Cu 12 Co 39%

Ni 2 1/2 Fe 2 Calcium 5

Si 2 1/2 H2O 14 etc

Thought comes from decomp of Cobalt Bloom

Found at Pria near Motril in Spain

Wea. THURSDAY 27 Ther.

Macfarlanite

As 21 Sb 3, Ag 59

Co 4% Ni 2

Fe 3 Zn 2

Wea. FRI. MARCH 28, 1902 Ther.

Smaltite in Colorado
Amer. Jul Science (3)
XXIII, 380
Sterling Mining Co
Gunnison Co Colorado
[illegible] of Cobalt bearing
minerals, Smaltite in
[illegible] [illegible] of [illegible]
[illegible] in [illegible] Conn
Gunnison Co
[illegible] in [illegible]
[illegible] Smaltite
[illegible] [illegible]

Wea. SATURDAY 29 Ther.

[illegible] [illegible] the [illegible]
from the Smaltite
Contains 11% to 15% Co
The Gem & other mines
near Silver Cliff
Colorado contain a
number of Nickel & Co
minerals & small
amount Co -

Wea. SUN. MARCH 30, 1902 Ther.

Working Wad - Eng Pat
4486 June 1882 J Soc Chem
Industry p 235

Wad fine ground
intimately mix 80 pts ore with
100 pts Sulfide Soda
anhydrous - add sufficient
H_2SO_4 to convert all
of the sulfide to
Bisulfide - Dry & fuse
in a furnace

Wea. MONDAY 31 Ther.

H_2O + SO_4 driven off
The Lime NaCl or Bauxite
fine powder added
to [illegible] the free
mass [illegible] heated
then broken up & cooled
soak out with hot H_2O
to clean sol add Na Sulfide
[illegible] Co Ni &
small amount Mn
filter

Wea. TUES. APRIL 1, 1902 Ther.

[illegible] Como to save
Sulfate Soda which
crystallizes out Mother liq
Evap dry mixed with
charcoal heated in
muffle furnace to
obtain sulphides
Mn

For process work

Wea. WEDNESDAY 2 Ther.

Cobalt Concl.

See Bertram Blount
book Chemistry for
Engineers
p. 195-96-197

Wea. THUR. APRIL 3, 1902 Ther.

[illegible] ores

As ore roasted mixed with
ferric Chl then ferrous
Chl - by [illegible]
[illegible] chlorides then
CoO to $CoCl_2$ H_2O
$CoCl_2$ leached out

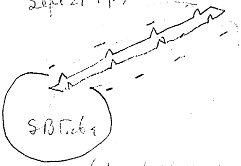
In Chili most important
mine for Co is

Wea. FRIDAY 4 Ther.

Vela Blanca of
San Juan averaged Co [illegible]
also at Tram 6.5 [illegible]

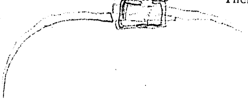
Wea. SAT. APRIL 5, 1902 Ther.

Sept 21 1905



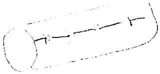
1006 [illegible] a ball [illegible]

Wea. SUNDAY 6 Ther.

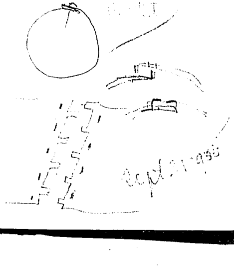


Wea. MON. APRIL 7, 1902 Ther.

Make loops [illegible] make a rest

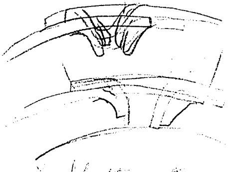


Wea. TUESDAY 8 Ther.



Sept 21 1905

Wea. WED. APRIL 9, 1902 Ther.



flatten out
clinch —

Wea. THURSDAY 10 Ther.

Sept 21 1903

Wea. FRI. APRIL 11, 1902 Ther.

Best

Sept 21 1903

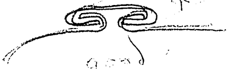
pineolida
drawn to

Burnmide-

Wea. SATURDAY 12 Ther.

packed after rings
on —

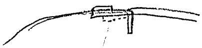
no good



good

Sept 21 1903

Wea. SUN. APRIL 13, 1902 Ther.



Mixhalls at?

Apl 21 1907

Wea. MONDAY 14 Ther.

See Engineering & Mining
Jnl Sept 23rd 1900
2nd Column p 540
about effecting
Tube mills -
Method determining best
speed -

Wea. TUES. APRIL 15, 1902 Ther.

See Gilmore Lea on S[illegible]
bad burning [illegible]
[illegible]

Try making Glucose
Old glucose impure &
maybe are something
but liable to [illegible]
by action of KOH,
also forms a viscous

Wea. WEDNESDAY 16 Ther.

Cobalt Ni or other
salt that will
take place glucose

Make the different
cells for [illegible]
with dry [illegible]
in [illegible]

Oct 1 1903

Wea. THUR. APRIL 17, 1902 Ther.

2 to 4% [illegible]

[illegible] that H_2SO_4

better than plain

[illegible] —

Have our chemist

work on increasing

[illegible] of $Zn(OH)$

in KOH

Wea. FRIDAY 18 Ther.

K [illegible]

Compatible [illegible]

also reducing [illegible]

Size thru 30 all fine [illegible]

Screen flake thru 15 & then

size [illegible] at def mesh

so that 15 goes with on 40

& 20 on - then mix in

proper proportions for tube

Oct 1 1903

Wea. SAT. APRIL 19, 1902 Ther.

~~See John Ott about hand machine for making [illegible] tubes [illegible] Fred Ott for packing moved [illegible] inside —~~

Prepare [illegible] tubes for Experiment

with Arsenite, Aluminum,

KI Copper, Pb Zn

Sn Phosphate, Chloride,

Bromide, Nitrates,

Gelatin, Humic, [illegible],

Wea. SUNDAY 20 Ther.

See how thick [illegible]

of very bright nickel [illegible]

[illegible] of .00012 or [illegible]

make some good tubes

wire bound or rings —

Glucose [illegible]

50 Double T

[illegible] from Holland all

Lalande [illegible] for

Newman & supply

plates cells etc —

Wea. MON. APRIL 21, 1902 Ther.

Let [illegible] inquire of other
Zinc distillers for powder.

[illegible] paint flake
perhaps so light be just as
cheap –

see if Hypo K [illegible]
[illegible] Cu plate [illegible]
Ca Hypo [illegible] soak

[illegible] Holland about
[illegible] 150 [illegible]

Wea. TUESDAY 22 Ther.

[illegible] Start [illegible]
[illegible] style [illegible]

[illegible] filling [illegible]
Pt Cut in two & try
Various ways – [illegible]
test one [illegible] –

Wea. WED. APRIL 23, 1902 Ther.

Detectn Pt –
F Field – Chem News
43 – p 75 add KI
– slight excess to $PtCl_4$
Pt Iodide dis – & if sol Conc
red liquid almost black
produced –
1 pt in 2 million detected
Col destroyed by H_2SO_4
Sulphite & Thiosulphite Na
Sulphurous a
Mercuric Chloride & other

Wea. THURSDAY 24 Ther.

reagents [illegible]
[illegible] if heated

1/10 1000 Pt. to [illegible]

Zinc + Pt [illegible]
+ Pt – Cd + Pt. Mn + Pt
Co + Pt Pb + Pt Cu + Pt
Hg + Pt Au + Ag + Pt –

Wea. FRI. APRIL 25, 1902 Ther.

~~[illegible]~~ Cut a tube
so 1/2 of mix tube is
exposed & then run it see
if mix tube goes to pieces

Prick holes in one tube
see if runs better –

get platinum needle
take out a tube of mix
lay on ford & use
needle see if not work

Wea. SATURDAY 26 Ther.

Carbide –

Take 2nd group tube
[illegible]
[illegible]
~~[illegible]~~ [illegible]
in glucose [illegible]
to [illegible]
Then [illegible] run –

Wea. SUN. APRIL 27, 1902 Ther.

[illegible]
[illegible]

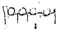
Nitrate K
Sulphite K
Persulphate K
Arsenite
Hypophosphite
Pyrophosphate
Citrate
Cyanide K
Chloride [illegible]

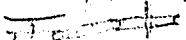
Wea. MONDAY 28 Ther.

Tartrate
Manganate
Ferrocy K
Ferricy K
Sulfocy K
[illegible] Sulphate NH
Thiosulphate
Oxalate K [illegible]
acid oxalate,
Chlorate,

Wea. TUES. APRIL 29, 1902 Ther.

1= Hegler ace of 4 ft rolls [illegible] of 36" rolls [illegible]

New sheaves. 36" also 24 

Lay out full size 
[illegible] grinding on [illegible]

Lay out [illegible] set ½ inch back [illegible] of [illegible]

[illegible] 5 rolls [illegible] 6" width

Wea. WEDNESDAY 30 Ther.

[illegible] several best [illegible]
[illegible] - & [illegible] following
5 grams Silicate Soda
5 " Manganate Soda
[illegible] Bromide K
5 " [illegible]
5 " Phosphate
3 grams BaOH
3 " Chloride Lead
5 " [illegible] Sulphate.

Wea. THUR. MAY 1, 1902 Ther.

Extraction Cobalt & Mn
Dingler Polyt J
Vol 252 p 392
Treat ores containing
Mn & Co with Ferrous
Sulfate & Enough water
to form a paste. Iron salt
reacts on Co & Mn
& boiling mix in Sol
of Co & Manganous
Sulphate of [illegible]
which is separated from

Wea. FRIDAY 2 Ther.

residue & treated
with suitable agt to
Convert the protos to
per Salt,

Try Conc SO_4 on 140
& displace by Kerosene

Wea. SAT. MAY 3, 1902 Ther.

500
400
5000
7
27) 1400
125
15
125

74

55000
5500
550) 55000
500

Harrison

Wea. SUNDAY 4 Ther.

2000

Wea. MON. MAY 5, 1902 Ther.

Nov 24th -
Ferric Sulphate dissolves
Cupric Sulfide, from
Ferrous Sulphate + Sulphate
Copper -
Ditto [illegible]
[illegible]
[illegible]

Hydrous Ox Cu dissolves
in Conc Sol Mg Chloride

Cobalt found in Coal

Wea. Try [illegible] Each TUESDAY 6 Ther.

CuS dis by Nitrate Iron
Hot -
ditto Ferric Sulphate
Sulphate Copper mixed sol
attack Copper by
being reduced to
Cuprous Sulphate
+ air oxidizes it back
to Cupric Sulfate

Wea. WED. MAY 7, 1902 Ther.

Ferric Sulphate dissolves
metallic Copper

Dip 3 tubes clean in
650 amperes in Conc.
of Ni NH4 [illegible]
peroxide -
our theory that Ni has
shrunk not contact
with flake -

Wea. THURSDAY 8 Ther.

Take some of the new Co flake
from Copper & clean
make 3 cells cold 3 Hot
inch strip in 21% KOH,
Run Cold & hot Electrolysis
Same as regulars -
Fred Ott make these -

Wea. FRI. MAY 9, 1902 Ther.

Dr to test for Cyanide in
our KOH, new & old
Solution,
test an iron or irons
that been in Hot test
with Co flake & see
if any Co on it or wonder
settles the mud,

Try 3 cells with sheet
Co hot test with

Wea. SATURDAY 10 Ther.

25 m.g. KCy in KOH,

put up Reg cups
filled with Co flake
from big drum
punchings & KCy
make about 15
& try hot 3 each
in KOH made
different ways

Wea. SUN. MAY 11, 1902 Ther.

When out new flake [illegible] good 1 lamp then [illegible] flake 1 [illegible] 75 Seconds green [illegible]

also reduce Glucose down to the [illegible] [illegible] [illegible] in No 243.

Wea. MONDAY 12 Ther.

group 5 up soaking [illegible] glucose [illegible] alkaline - then soak 45 hours 33 % KOH. 65 [illegible] chg

Wea. TUES. MAY 13, 1902 Ther.

Put up 3 glass cells containing [illegible] of Co flake with Chl K in KOH. ditto IK - Sb_2O_3 of KOH or Sulfide Sb 25 mlg To 100 cc KOH.

~~think that [illegible] yellow on Rubber in cell, that wasn't bad was sulphide antimony~~

Wea. WEDNESDAY 14 Ther.

also with KS in

[illegible] not good from 2 of 6 and in group 4 1 that is still good in group to see state of flake - saw that first -

Wea. THUR. MAY 15, 1902 Ther.

Try Nickel in KOH with Co film sheet

Test the lead (1C)

Galena from Blackwells mine near sees see if Selenium & Cobalt & Ag —

Wea. FRIDAY 16 Ther.

May be Clausthalite

Se 27 Pb 63 – Co 3.4

Worth about 5/8 1/2 mica diaphram

Have Holland try 2 CuO plates 1 Zn Reg 21 Lalande see what V & amp

Wea. SAT. MAY 17, 1902 Ther.

if good results try more surface

See if there really is any Ni or Co in KOH after been running 30 Hats acidulate until slightly acid to decompose any KCy boil & then redisp by KOH. also try NH₃

Don't give Dr any more Co assays send them McCreath let Dr assay the Gum rubber & KOH

Dally to distill Small kiln with charcoal in Earthen retort

Wea. MON. MAY 19, 1902 Ther.

Made some dried green
of nickel [illegible] in strong
NiCl2 dry mix hydrate
& Ca flake - soak water
Soak phos soda etc
This precipitates Phos Ni in
or Oxalate
pores, then glucose
NaOH water & soak
out very weak KOH,
then put in ~~10~~ per cent 5%
bring to [illegible] to change
Oxalate or phos & swell
the ni granules —

Wea. TUESDAY 20 Ther.

Group to be changed
Long charge & allowed
rest 24 hours &
given a 1/2 charge
Idea being that
1st charge has something to
do with subsequent
life & capacity

Wea. WED. MAY 21, 1902 Ther.

another group -
Reverse several times
then chg Reg —

Another group to be
used with old irons
that have already
be long on test [illegible]

All new groups to
have good CP rubber

Wea. THURSDAY 22 Ther.

group of 3 with 100 Mlg
following
Ammonium of alkali
Nitrate
Chloride ✓
Bromide
KCy ✓
Ferrocy
Arsenate
Arsenite
Phosphate ✓

Wea. FRI. MAY 23, 1902 Ther.

Hypophosphite

Sulphate,

Borate

Ammonia –

KS

Lead ox

Barium hydrox

Lime

~~[illegible]~~

[illegible]

Wea. SATURDAY 24 Ther.

Zincate

Copper

Hypochlorite K

Perhaps phosphorus

as phosphate in bad

in Cell in future

Wea. SUN. MAY 25, 1902 Ther.

Schnabel says that if

Cu anode contains

Considerable amount of

Tin the Copper is not

Malleable & smooth

Arsenic dissolves in acid

or neutral Solution as

Arsenious acid

as soon as solution saturated

its thrown down as Arsenite

Wea. MONDAY 26 Ther.

from neutral Sol arsenic

is deposited at Cathode

as metal from acid Sol.

only when Sol is poor in

Copper

If arsenic exists in the anode

as Arsenite goes entirely into

slimes but in acid Sol

its gradually dissolved

as Arsenic acid in

Consequence of Secondary

Reactions

Wea. TUES. MAY 27, 1902 Ther.

Depositing Voltage of Arsenic is near Copper & it can be plated out in a spongy state when the current density exceeds 33.5 amp per square yard in sulphate solution .125 milamp per inch

Arsenic can be precip by stream of air & warm sol of Ferrous Sulphate the Arsenic combines to form Ferric Arsenate.

Wea. WEDNESDAY 28 Ther.

Arsenic acid anhy
As_2O_5

Arsenious As_2O_3

Arsenious ox dis in KOH but dont neutralize it.
Comc salt decomposed by CO_2 of air -

Wea. THUR. MAY 29, 1902 Ther.

when KOH saturated it partly crystallizes out

K Arsenite
neutral salt
$K_2O\ As_2O_3$
acid salt
$K_2O\ 2As_2O_3\ 2H_2O$

Wea. FRIDAY 30 Ther.

Arsenious acid sol
1 to 10 H_2O Hot
1 to 30 " Cold

Wea. SAT. MAY 31, 1902 Ther.

Think Can Roast Darby
+ melt + pour to anode
put in KOH strong with
Nickel Cathode +
form Arsenite K &
deposit Arsenic on
Cathode at Low
density without
any Hydrogen

Wea. SUN. JUNE 1 Ther.

Also try KCl. Solution
for leaching Wad
Try Bisulphite of
Lime its soluble.

Wea. MON. JUNE 2, 1902 Ther.

test Warrens flake
for arsenic,

Weigh out some Darby ore
~~Roasted ore dissolved~~
~~in HCl~~ + Roast it
thoroughly + see how much
it loses — in small 1½" Evap dish
porcelain —

Have Fred Ott fix
the film Cells so switch
dont Cut them off

Wea. TUESDAY 3 Ther.

so run all night.

Johnny to send Warren
1000 — William just before
Christmas 100 + Tom 100

Fred Ott ~~make~~ get piece
Warren anode 60 Co 40 Ni
+ Start more plating out the
Co — Fred to Cut out + polish
small anode —

Wea. WED. JUNE 4, 1902 Ther.

Scheme Co oxidizes very much easier than Ni - oxidize the arsenic [illegible] - take some 200 [illegible]

[illegible] Darby or [illegible] in small Evap dish a long time on sand at low temp. until all the Co oxidized leaving the Ni [illegible] dissolve out the CoO by HCl dilute,

In roasting Darby dead

Wea. THURSDAY 5 Ther.

treat with boiling water to dissolve any arsenic acid left by roasting Test the water see if it really has arsenic -

[illegible] to use NaOH,

or better still [illegible] out [illegible] by HCl [illegible] then treat NaOH, [illegible] SO_4 H_2SO_4

Wea. FRI. JUNE 6, 1902 Ther.

perhaps if Darby 200 in roasted to 1% arsenic Hot Hypo might oxidize balance & then Hypo washed out would render use of H_2S unnecessary

If mixed chlorides Ni Co be precip by Carb Soda & precip well washed & then suspended in Water & Chlorine passed thro the sol then filter the chloride will contain the cobalt of the Nickel as Chloride [illegible] free Co

Wea. SATURDAY 7 Ther.

possibly NiCo Chloride precip by KOH containing NH_4 that more Co than Ni be precip according to amount NH_4 in the KOH.

Especially if the chloride treated H_2O_2 to per oxidize the Co,

or acetate Ni Co & peroxidize by H_2O_2 or precip by Hypo Containing NH_4

Wea. SUN. JUNE 8, 1902 Ther.

New Idea Sep Ni & Co
double K Ni Sulphate & K Co S
have different solubilities

Operate thus, make
strong Solution of Ni & Co
Sulphate, (19) Danby.
while hot pour in
Concentrated hot so
of Sulphate K, Stir
while let the Crystals
separate then filter
The Ni K Sulphate Salt

Wea. MONDAY 9 Ther.

will Come down as
it is 3 times less sol.
This is better scheme
than using hydrates
to Sep —
Be sure & Concentrate the
Danby — & remove Fe
first, or reduce any
iron present by passing
H_2S otherwise iron

Wea. TUES. JUNE 10, 1902 Ther.

will come down with the
sulphates
Look in Solubilities & see
of Na Sulphate and Cobalt
Gibbs says better, where
he separates Co & Ni by
this process —
Perhaps by adding
proper quantity of K Sulph
Saturated at once
the whole of separation
Can take place —

Wea. WEDNESDAY 11 Ther.

if proper solution may have
to Cool after each
Section
Fractional Crystalization
by putting in Oxalic a
in the Sulphates of Ni & Co
Solution — Cold also
Cooling —

Wea. THUR. JUNE 12, 1902 Ther.

The Oxalic process may be just the thing as it displaces Sulphuric — the reaction is slow giving chance for molecular arrangement —

Possibly it should be done in darkness possibly Cold or Heat,

Wea. FRIDAY 13 Ther.

Would get all the H_2SO_4 back & only lose the Oxalate,

ammoniacal H_2O_2 oxidizes & dis Cu Sulfide —

Wea. SAT. JUNE 14, 1902 Ther.

Crookes says Sulphide of Cu is sol in ammonia

S S

This is good

Copper immersed in Cupric Sulphide solution with ammonia, the Copper dissolves until all of the Cupric Sulphate

Wea. SUNDAY 15 Ther.

is reduced to ~~cuprous~~ Sulfate — The solution should be diluted with deaerated water & closed up —

Kly removes CuS as Sulfide, hence it may be possible to Rejuvenate the Kly

Wea. MON. JUNE 16, 1902 Ther.

NH_4S + KS + then in

Try in flake [illegible] SO_4

Slightly warm & blow

and thoroughly –

also NH_4 & blow air thro

in using K Sulphate to

work Quickly – add

the proper amount KSO_4

to Solution & Evap

down Etc – as well.

Wea. TUESDAY 17 Ther.

as using Conc ~~[illegible]~~

Lelande

Boil a Copper oxide

plate in Conc KOH,

also in melted

KOH, makes a

higher oxide

also Na or K chlorides

Wea. WED. JUNE 18, 1902 Ther.

Try in Lelande

Rosin – Stearic –

Lelande Try as

Electrolyte

2 pts $CaCl$ 6 H_2O

into which 3 pts

Lime hydrox dissolve

The ZnO Combines

Wea. THURSDAY 19 Ther.

with $Ca(OH)_2$

falls to bottom –

~~S~~

Wea. FRI. JUNE 20, 1902 Ther.

Try Sulphocyanide of
of K - ide of dissolving
Copper - or Sulfocy
NH_4 -
The precip Copper out
by Barium Sulphide -
p 18, Chem Engineering
Vol 1 -

See if this works dis
Copper by Sulphocy
of K - if H dissolved.

Wea. SATURDAY 21 Ther.

Throw down Cu as
Sulphide by H_2S - &
recover the Sulfocy

also try precip
from KCy CuCy the
Copper by H_2S.

Wea. SUN. JUNE 22, 1902 Ther.

acidulate the KCy CuCy
with HCl - absorb the
HCy in KOH, then while
solution very acid
& KCy dissolved
pass H_2S - This should
throw down CuS
& the H of H_2S form
with the Cy HCy
which is absorbed

Wea. MONDAY 23 Ther.

by the KOH.
Roast the CuS to oxide
& use in Lalande

Wea. TUES. JUNE 24, 1902 Ther.

Sep Co fm Ni by diff in deg of oxidizability of their sulphides —
Ni & Fe oxdz most rapid
Mn next = Co Cu Zn oxdys very little —
Most Sulphides Ni & Fe is pressed together by fingers then powdered
Rise temp 45 deg C Steam — p 199
No 34 1898 — Chem S J

Wea. WEDNESDAY 25 Ther.

Scheme Sep by osmose of acetone & other organic sol one side, chloride of Co Ni other side
also NaCl 1 side CoCl NiCl other side
NaCl can be replaced by other chems

Wea. THUR. JUNE 26, 1902 Ther.

If Co bloom is decomp by NaOH then we can roast Dry by 1st driving off all the arsenic then adding NaOH & calcining the roast & lixiviating —

Phos Ni is completely sol in acetic acid while phos Fe is insol, when there is an

Wea. FRIDAY 27 Ther.

Excess of Na phosphate
No 34 1898 Chem S J p 244 245 —

Dyer patent Kiln — proportions in that portion of furnace non clinkering in contact with a settling chamber, the dust passing to furnace into from settling chambers,

Wea. SAT. JUNE 28, 1902 Ther.

[illegible] powder are [illegible] mixed with Charcoal [illegible] white heat all arsenic goes off as metallic —

or Roast as far as possible then mix with Charcoal and heat or better pass CO, all arsenic goes off as metallic

~~[illegible]~~ then Roast 200 mesh Ore, in air then with Salt and roast in air — Evap, dry & reach alcohol —

Wea. SUNDAY 29 Ther.

—

Arsenite & Arseniate insol alcohol

Fuse some Cobalt ore with KOH [illegible] of As all dissolves out

Wea. MON. JUNE 30, 1902 Ther.

Where HCl is principle object instead of 2 NaCl 1 H_2SO_4 an excess of ~~HCl~~ NaCl is used then the HCl is not contaminated with Sulphuric a

In HCl condensing tanks Sandstone is used if open its breaking in tar after drying of dense tar not necessary

Wea. TUES. JULY 1 Ther.

in dilute Sol HCl will replace Sulphuric from Na Sulfate in proportion of 2 NaCl to 1 Na_2SO_4 only in Conc condition will H_2SO_4 displace HCl from NaCl.

Wea. WED. JULY 2, 1902 Ther.

The Aussig Chemical works supply stoneware or Condensing app for HCl to German chemical works

(where is Aussig works situated?)

Aussig Austria

Wea. THURSDAY 3 Ther.

Write Bob Spice about getting me some Expanded Irons —

[illegible] can be thrown down by precipitated metal from salts while hot,

Wea. FRI. JULY 4, 1902 Ther.

1 = write Bergmann to get all the Catalogues, & price lists Aussig Chem Wks. Aussig Austria Chemical Earthenware Hydrochloric acid Condensing app. etc

2 = Write Bob Spice Pratt Institute get bright young men —

3 = Hurry floor & assembling of crane plating bldg

4 = about getting Crocks for plating

5 get Catalogues Genl Elec & other makers plating machines & motors for ditto

6 = get Boschs land Binocular for Cement,

7 Fred Ott fix muffle for arsenic run pipe out doors & put a hood —

Wea. SATURDAY 5 Ther.

8 = Record Ostwalds Grinding & get a supply of those that work.

9 = Scheme out apparatus for KCy recovery

10 " " for dissolving Cu in flake in KCy

11 " Washing & Drying —

12 = Mould for drums, drawing for it & Top,

13 = find out from Abbott address of party making chem pots in Phila —

14 = Hester find plan of previous house at Edison — Compare this at Silver Lake

15 = find agts Blake Crusher for fine Grinding

16 Miller find out about Maleteer burner

Wea. SUN. JULY 6, 1902. Ther.

17 Try get another [illegible] —

18 - go over see Waidig [illegible], abt Malatery

19 look in big directory for makers [illegible]
To get clue to [illegible] burners.

20 - see draftsman [illegible] too heavy

21 - Cawley make 2 lbs of [illegible] them

22 - get [illegible] Kly from [illegible] of Naly - [illegible] plate

23 [illegible] all get 200 [illegible] Cobalt
plated — Cawley [illegible] to plate them
in quantity —

24 - [illegible] the good rubber has arrived for [illegible]

25 Holland [illegible] Washing [illegible] in [illegible]

Wea. MONDAY 7 Ther.

26 - [illegible] patent [illegible] in [illegible] or mechanical [illegible] of dust + [illegible]

27 - New roller bearing chain — also [illegible] — connecting ball bearings together.

28 - Rejuvenating Kly from Copper [illegible] K

29 [illegible] head in [illegible]

30 see that Kly can be [illegible]

31 [illegible] plate [illegible]

Wea. TUES. JULY 8, 1902 Ther.

32 - plate out Cu from the [illegible]
by adding enough KOH. to
take care of the Cu of
the Cu plated out

If this dont work [illegible]
[illegible]
which is cheaply [illegible]
into Kly —

[illegible] says Copper [illegible]
[illegible] 1 lb Cu [illegible]
1 lb [illegible] to [illegible]
[illegible]
[illegible] 600

Wea. WEDNESDAY 9 Ther.

10 X 10 X 12 —

Receives [illegible] 65. [illegible]

[illegible] complete no hose —

Sul a 65° Baum Atlantic Dy Co
45 mills per lb - delivered

9 [illegible]

Wea. THUR. JULY 10, 1902 Ther.

Present [illegible] purer at [illegible].

[illegible] Ward at [illegible] is –

dis the [illegible] by ferrous Sulphate, filter, precip the Ni + Co by Na Sulphide only little Ni comes down – wash precip press thru filter paper then treat with perchl Fe most Ni goes into sol

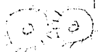
Wea. FRIDAY 11 Ther.

partly as Sulfate + partly as Chloride, leaving comparatively speaking pure residue of Ni + Co Sulphides behind

New S Wales Rep! p. 232

Wea. SAT. JULY 12, 1902 Ther.

Fred [illegible] to make a pair brush rolls inch or so dia one roll go 30 the other say 50



to [illegible] the angle

[illegible] K is the positive ion $Ag(CN)_2$ the negative ion, the K acts secondary on the $AgCN_2$ + deposits silver

Wea. SUNDAY 13 Ther.

Charcoal at red heat reduces Cyanate to Cyanide K –

Cyanogen [illegible] by KOH forming KCy + some Cyanate which decomposes [illegible] + CO_2

Wea. MON. JULY 14, 1902 Ther.

Perhaps can use iron
Anode in the Cu Key sol
& prevent the copper to
form Prussian blue
& get the key back
by regulating the blue with
Chem Potash
Turning Iron Chloride &
Key —

also rubber rolls
30 Rev + 50 Rev

Wea. TUESDAY 15 Ther.

Soft rub —

If the two revolving brushes
work them make a gong

Wea. WED. JULY 16, 1902 Ther.

Try conc Sulphate Iron
mixed with flake then
damp to dry then
press by Cold KOH
to form a direct mesh.
probably all my boxes
[illegible]

probably the best circular
brush would be a
moulded soft rubber
with fine teeth 1/32 long

Wea. THURSDAY 17 Ther.

157

Wea. FRI. JULY 18, 1902 Ther.

Very Conc Monosulphide K attacks in presence of ... Cupric Sulphide then decompose with Cuprous Sulfide ... Sulphur ... forms ... double sulphide ... Cu + K Soluble in the solution

The action is 1st formation of KOH, + Cupric Sulfide

Wea. SATURDAY 19 Ther.

the latter as fast as formed splits up into Cuprous Sulfide which forms the double salt $K_2S\,4Cu_2$ + the sulphur which forms polysulfides —

Chem Soc J 1903

[illegible] 1384

Wea. SUN. JULY 20, 1902 Ther.

Treat flake with KS fully then oxidize the CuS by Kpermang in alkali also by H_2O_2 hydrate to form a sulphide of the CuS

Cu sulfide Combines with Sodium Hydrosulphide to form a Double salt Soluble in NaS

Wea. MONDAY 21 Ther.

[illegible]

554 Chem Soc 5210

Wea. **TUES. JULY 22, 1902** Ther.

[illegible] affinity of sulphur for metals [illegible] - Pt. Hg Ag Cu Bi Cd
Sb Sn Pb Zn Ni Co Fe As Tl
Mn - The weakest is Mn

If KS acts on Cu gives CuS. If now the flakes are perfectly washed in C P water the CuS dissolves to a colloid but is precip by the slightest trace of salts. After flake has been in KS wash it by dilute H_2SO_4 by decantation

CuS dissolves somewhat easily in alkaline Thiomolybdates forming Cupric thiomolybdate on adding HCl it is precipitated unchanged - CuS dis in

Wea. **WEDNESDAY 23** Ther.

ammonia Thiomolybdates

If CuS is washed with water containing HS by decantation until free of all salts it dissolves to a colloid

Thioarsenates, platinates & Tungstates form double salts with CuS & dissolve

Wea. **THUR. JULY 24, 1902** Ther.

Try Cyanate K on Copper

Try KCy in Alcoholic [illegible]

Try KCy [illegible] on "

[illegible]
[illegible]
add Some KCl.

[illegible] Copper plating -

Wea. **FRIDAY 25** Ther.

Try [illegible] Cu in KCy [illegible]

[illegible]

[illegible] for Catalogue Containing all the [illegible] on Electroplating [illegible] [illegible] books [illegible] Electrochem [illegible] -

Try [illegible] Sol [illegible] plating -

Wea. SAT. JULY 26, 1902 Ther.

Calylusive [illegible]

To Fe of Battery add
Arsenic in mixing
possibly in the water after
reduction —

also Pt Cl, to form a negative
metal on Fe so it will [illegible]
it without [illegible] [illegible]
so that on Cadmium [illegible]
it would be on the [illegible]
quite [illegible] [illegible] —

Wea. SUNDAY 27 Ther.

Battery — Mix some graphite
with the Co [illegible]

Moved the [illegible] on [illegible]
take out & insert in [illegible]
[illegible] outside so can [illegible]
Change [illegible] also
Coat outside with
plenty [illegible]

Wea. MON. JULY 28, 1902 Ther.

Add Chromic hydrate to
Lelande — forms green
precip with ZnO in KOH,

Fluoride Zn forms Double
Sol salt with Fluoride
of K,
Fluoride K in Lelande
ought to work —

Try $ZnCl_2$ in Methyl
to plate — of Ethyl

Wea. TUESDAY 29 Ther.

also $CoCl_2$ in Methyl

Mixture Sulphurous
acid + Sulphuric = HS
[illegible] Co —
Make by passing
HS thro Sol Sulphuric
acid —

Wea. WED. JULY 30, 1902 Ther.

Sodium Borofluoride of K [illegible]
Titanofluoride K
Stannofluoride

Phosphomolybdate of K
Phosphotungstate of K
Borotungstate [illegible]

Try plating CoCl₂ in Acetone
Zn
Cu

Wea. THURSDAY 31 Ther.

When get flake, use [illegible]
Soak [illegible] KOH, Low temp
of charge & discharge [illegible]
by platinum only then put
in Iron - Idea is to oxide
it good before it gets chance
to deposit iron [illegible] on
flake & tube walls —
Running Cold & then after
hot was good on the [illegible]
due to other cause —

Wea. FRI. AUG. 1, 1902 Ther.

Cuprous Chloride dissolves in
NaCl or CaCl, it acts on
Sulphide Copper thus
$CuCl_2 + CuS = Cu_2Cl_2S$.
dissolving the CuS & liberating
Sulphur —

Cuprous Chl in NaCl
When containing Arsenic
Iron Sb or Bi is thrown
down by CuO or Caustic
Lime — I spose the
Cuprous Chloride in NaCl sol
Wea. SATURDAY 2 Ther.
that is meant —

Try Darby roasted mixed
with lime & charge in Electric
furnace —
then Electroplate see if arsenic
left in mud,

Reduce Darby roasted
ore by Hydrogen —
& dissolve by HCl see if
arsenic left behind

Wea. SUN. AUG. 3, 1902 Ther.

Cu sulphate (acid) is reduced by Cu to Cuprous in air

Dissolve Dienby ore by Sul[illegible] + crystalize out the Co Ni get rid arsenic — try Chlor[illegible]

also dis in HCl ~~and~~ reduce any arsenic [illegible]

Dry + dissolve in Ethyl & Methyl al —

at the anode [illegible] Solution of Sul Cu

Wea. MONDAY 4 Ther.

is crystalized then mother liquor ~~[illegible]~~ acid dep — then mother liquor boiled + Cu + arsenic thrown down — bal left is Sul acid. The mix of Blue Vit is dis in least amount water & Blue Vitriol dis & leaves arsenic acid —

Wea. TUES. AUG. 5, 1902 Ther.

Ulke says best way get rid arsenic is to deposit at a low density [illegible] about Copper/Voltage

Same at Mansfeld Germany

Solution Contains Ni Co Fe As — the arsenic is deposited along with Copper when the current density exceeds 33.5 amp per sq yard

The sulphates of Co Ni + C

Wea. WEDNESDAY 6 Ther.

are crystalized out + acid liquid used over again —

Get Borcher's Electrometallurgie —

Borcher removes arsenic + iron from the Mansfeld Copper sol by blowing air in fine streams precip As + Fe in acid sol as Ferric Arsenate

Wea. THUR. AUG. 7, 1902 Ther.

Bi + Sb are thrown out as acid when it becomes less acid

Try amalgamating CuCa flakes. Na in Hg

~~Dissolve Darby with H_2SO_4 add KCl. Will then get on the Cl. KCl. Crystallizing~~ ~~Crystalize the K sulphate out~~

Darby dis by H_2SO_4 add NaCl — This

Wea. FRIDAY 8 Ther.

Turn the ore into Chlorides, without necessity of HCl, the sulphates will not bother in percolating could probably crystallize most of sulphate out or evap the chlorides so as to make them anhy

Wea. SAT. AUG. 9, 1902 Ther.

of the lead go then use Bisulphate & salt on ore. Regenerate the Na sulphate add acid to make it Bisulphate again

Fuse roasted Darby with NaO_4 Carb Soda. This will permit the arsenic as arsenate soda leach out, also try ~~KOH~~, NaOH, also Ca + NaOH, also NaCl,

Wea. SUNDAY 10 Ther.

Boil Darby roast with Hypo KOH for long time exhaust then boil H_2O once or twice & then in HCl evap dry dis in H_2O & test for arsenic —

Wea. MON. AUG. 11, 1902 Ther.

Darby Unroasted ore fuse
with Chlorate K & KOH,
Exhaust water - this should
remove arsenic.

also Try Darby roasted
fused with [illegible] chloride
Exhaust H_2O -

Hyposulphite Soda dis
Ag & Cu as metal - also gold
Try this I only tried it

Wea. TUESDAY 12 Ther.

on CuS -

The Thiosulphate Copper
Can then be precip by
Na Sulphide & thus
Regenerates the
Thiosulphate of Na

Solvent - no loss due to
formation [illegible]

Wea. WED. AUG. 13, 1902 Ther.

Antimony & Arsenic Silver
Compounds give up their
Silver to Thiosulphate Na

20 grms to Litre dis at 54 C
about 100 mlg of Silver
Copper about same, but sol
Can be continuously run thro
& Cu precip by H_2S &
thus regenerated -

Wea. THURSDAY 14 Ther.

our trouble with plating Zn
is probably due to Arsenic
Schnabel p 916 917 = continuously
filter the Electrolyte thro
Zinc shavings
Says to prevent spongy
deposit of Zinc must
have sol free of Cu As Fe
Try this - also make some
Electrolytic Zinc this
way & use it as anode

Wea. FRI. AUG. 15, 1902 Ther.

Purifying the ~~[illegible]~~ Sulphate
Zn by filtering thro
Zn shavings

Should be Zn Ox at bottom
& Top shavings but,
The Ox Zn which precip
Ferrous sulphate.
Solution liable become
basic from taking up Zn Oxid
He says when Electrolyte is
purified this way & is kept

Wea. SATURDAY 16 Ther.

Circulating during Electrolysis
& when Electrolysis is carried
out at temp of 15° to 20° C
with density of 5 amp per
square yard the chance
of spong Zinc is completely
obviated. Density of
Electrolyte 1.4 to 1.6
B—

Wea. SUN. AUG. 17, 1902 Ther.

It looks as if Ni(OH)-Electrode
+ KOH with Silicate of K &
Zinc Electrode say Mg
& CP Zinc might be made to
work after all as the K Silicate
increases the [illegible] power so
much — Arsenic Cu + Fe
Can be got rid of by the Zinc
Shavings process & several
times depositing the Zinc
or purifying the Sulphate
by Zn Shavings & depositing
it out 2 or 3 times &

Wea. MONDAY 18 Ther.

using this Zinc for
battery —

Ferric [illegible] added to KOH
increases [illegible] of [illegible]
try it on Cu plates

Wea. TUES. AUG. 19, 1902 Ther.

If use Zn. + have to have
acid sol of Co Sulphate.
better use Boric acid for
rendering it acid, Try
Boric + Citric, these acids
probably not ~~ate~~ dis the Zn
+ force the Co Solution—

or with Fe as well— Fe will
not reduce the Co, anyway
Neither will Zn to any extent
if sol Cold— of course it

Wea. WEDNESDAY 20 Ther.

will oxidize some + then
would dissolve in the Sulphuric
acid used to keep Co solution
acid but Boric acid
would form an insol Zn Borate
+ probably keep it out of
solution—

Make an Experiment with
Deposited Zn + dip it
in ~~[illegible]~~ some of our
plating sol see if it
deposits Co—

Wea. THUR. AUG. 21, 1902 Ther.

if so— neutralize the Co by
hydrate of KOH, then
add Boric also in
another sol by Citric
+ see if it reduces Co
then—

Try some Roasted [illegible]
Ore mixed with powdered
Charcoal + brought up to
white heat in Blacksmith
forge to see if any more
arsenic can be distilled

Wea. FRIDAY 22 Ther.

off— probably good deal
by reduced to metallic Co Ni
+ make it sol in H_2SO_4—
Then by putting in NaCl
possibly get to Chloride
+ thus we get rid of As +
HCl—

Wea. SAT. AUG. 23, 1902 Ther.

It looks as if 10% oxide should be harmful rather instead of 20% as now used -

For Leclanche use Silicate of ammonia. This forms Silico Zincate of Ammonia - try KOH, also.

Wea. SUNDAY 24 Ther.

Set up 5 Reg flat positive in little cell 250 atmos hot test,

also NiOH + 10% Bismuth Hydrox made as it is pretty perfect by together ~~also~~

Wea. MON. AUG. 25, 1902 Ther.

Jany 7 1906 -

Try the new K Silicate 40 grams in 200 cc 21% KOH in Reg 11,7/8 along flat plates

arsenious acid is reduced by copper use SO_2 to reduce any

Wea. TUESDAY 26 Ther.

arsenic acid -

Nitric acid in a liquid even in small quantity prevents formation of the gaseous hydride by zinc. it forms the solid hydride pretty a brown flake on the zinc

Wea. WED. AUG. 27, 1902 Ther.

HCl SG 1.115 dis arsenic to fluoride while SG 1.?? dis it as acid

+ fuming Stannous Chl strong in HCl 1.115 – perhaps all arsenic so it can not be detected by Marsh app –

SnCl gives no precip in Reg aq sol but only when strongly HCl –

Wea. THURSDAY 28 Ther.

Possibly anhydrous HCl – will convert all roasted Bornite into Chlorides the Fe will pass the arsenic & with excess of HCl it can be removed by HCl

Wea. FRI. AUG. 29, 1902 Ther.

liquid without dissolving the $CoCl_2$ etc or The whole dis in HCl & brought up to 300 C & then treated with anhydrous sulphuric acid phosphoric in which the $CoCl_2$ is not soluble –

perhaps some of the liquids organic would dissolve out the

Wea. SATURDAY 30 Ther.

acid (?) the liquids in which $CoCl_2$ or $NiCl_2$ is not sol in

Loves oil test

Wea. SUN. AUG. 31, 1902 Ther.

In dissolving Ars. [illegible] Concentrating the solution down very much & adding Sulphurous acid to [illegible] the arsenic to arsenious & then evaporating down, or add BaOH [illegible] throw down the Sulphuric) we ought to be able to crystallize most

Wea. MON. SEPT. 1 Ther.

of the Arsenious acid — $1/2\%$ Sol in water

Wea. TUES. SEPT. 2, 1902 Ther.

Cold Alcohol only dissolves 1.68 pts in 100 of 56% — 86% dissolves 0.715 — absolute dis 0.025 pts in 100, above is for only [illegible] for the [illegible] arsenious [illegible]

56% alcohol 0.5 [illegible]
88% 0.71 [illegible]
absolute 1.060 ?

Wea. WEDNESDAY 3 Ther.

Arsenious Ox at gentle heat & Chlorine gives AsCl by gradually increasing heat gives off major part as $AsCl_3$ residue is arsenate of arsenic heated with Sal ammoniac gives $AsCl_3$ & [illegible]

Wea. THUR. SEPT. 4, 1902 Ther.

45-

41
19
60
15

Wea. FRIDAY 5 Ther.

Wea. SAT. SEPT. 6, 1902 Ther.

176 | 746 (4.23
704
420
422
380
6

9,75 25% 66

150
600 905
195
4525

Wea. SUNDAY 7 Ther.

8125
905
17627 5

423
975
2115
2961
3807
41425

Wea. MON. SEPT. 8, 1902 Ther.

arsenic acid boiled
with strong HCl is
converted to chloride
of As –
perhaps by dissolving
[illegible] +
using strong acid –
The As got into chloride
by [illegible] 115
then [illegible]

Wea. TUESDAY 9 Ther.

also the As Cl₃ [illegible]
not the Co Mc Cl₂

Wea. WED. SEPT. 10, 1902 Ther.

Mixed solution of
arsenic acid
Stannous Chl precip
soluble precip of Stannic
arsenite $2Sn_2As_2O_3$

Magnesium ammonia arsenate
very little sol in H_2O
& almost insol in ammonia
sol – 2600 pts water at 15
15800 NH_4 to 3 [illegible]
846 – Conc sol of Sal ammoniac

Wea. THURSDAY 11 Ther.

1315 Dilute sol

possibly by using Mg
could get out most of
arsenic from dissolved
roasted [illegible]
at red heat loses NH_4
+ goes to Magnesium arsenate
very stable at high
temp

Wea. FRI. SEPT. 12, 1902 Ther.

$CoCl_2$ if Conc to BP 111° C on [illegible] is $CoCl_2$ $6H_2O$ heated to 116° $CoCl_2$ $4H_2O$ Then [illegible] $CoCl_2$ $2H_2O$ at 121 [illegible] Concentrated into the [illegible] salt. at 140° C it [illegible] water - its pale blue & must not be exposed to air as it quickly

Wea. SATURDAY 13 Ther.

absorbs water. it goes to $6H_2O$ at once

[illegible] Expanded [illegible] in [illegible] Solution.

Wea. SUN. SEPT. 14, 1902 Ther.

See [illegible] a [illegible] [illegible] deep for new SB [illegible]

also [illegible] 200 [illegible] H_2O D[illegible]

Wea. MONDAY 15 Ther.

Try Silicate + KOH in Leclanché - also for Leclanche Dry cell -

Select a low tube from good set & force rings [illegible] it see if it comes OK -

Open up a wet tube notice [illegible] Etc -

Wea. TUES. SEPT. 16, 1902 Ther.

Hurry up Chem Plant
for Darby –
also Roll plant for 004 steel,

Find out price Hydraulic
press to give same pressure
as 250 atmos on our
press, find the relation

Test Zinc for flake plating
use of Zn reduces $CoCl_2$
acid [illegible] plating solution

Wea. WEDNESDAY 17 Ther.

pickle the Zinc –

Write the young man
[illegible] in tutoring
offer 15 to start

Wea. THUR. SEPT. 18, 1902 Ther.

Caustic Lime Converts
Acetone into Mesityl
Oxide – dehydrating agents
readily act on acetone
turn it into Condensation
products –

Mercuric oxide is sol
in acetone in presence
of KOH – our tests
went bad with acetone
wasnt it the Hg

Wea. FRIDAY 19 Ther.

Try Cu Co flake in
acetylene & combine
Says Copper pipes
cant be used with
Coal gas on account
of 0.006% acetylene

Write to Mallory that when
we can spare a draughtsman
to send him to Orange

Wea. SAT. SEPT. 20, 1902 Ther.

Black porous clinker
glass OK –
5000 milgms put in Gell
Jar with Sponge –
End of

1 hour –	5003.5
5 "	5017
20 "	5030
29 "	5050
41	5081
47	5087 –

Wea. SUNDAY 21 Ther.

Try 5 grms flake Co Tin(?)
in pocket possibly an
anhydrous perox may be
formed & it will run

Possibly Ni(OH)$_2$
should have some
Cobalt in to act
as Catalyser or
it may be bad –
the gel Now has Co
in it – E

Wea. MON. SEPT. 22, 1902 Ther.

What is wanted for
Lalande is a hydroxide
& not an anhydride of
Cu Oxide to make
the action OK –

[illegible] may be [illegible] CuO$_2$
[illegible]
Ni(OH)$_2$ which there no
impurity?

Wea. TUESDAY 23 Ther.

[illegible] Ni(OH) [illegible]
[illegible] Na [illegible]
[illegible]
[illegible] which
also [illegible]
Anode, Ni [illegible]
& put in KOH [illegible]
Na silicate [illegible]
Current [illegible]
& [illegible]

Wea. WED. SEPT. 24, 1902 Ther.

Have Dr [illegible]
[illegible]
in the [illegible]
[illegible] been there
[illegible]

Wea. THURSDAY 25 Ther.

Wea. FRI. SEPT. 26, 1902 Ther.

[illegible] Sb – 5 pts Tartar Emetic
5 pts Tartaric acid dis in a
solution of 2 pts KCl & 50 pts
H_2O Sb [illegible]
Silvery grey color [illegible]
surface [illegible]
[illegible] structure
SG 6.8[illegible]

With Sol [illegible] Tartar Emetic
[illegible] Sb
(in HCl?) deposited color
steel polished [illegible]

Wea. SATURDAY 27 Ther.

amorphous fracture bright,
When heated or struck
undergoes great change heating
from 60 to 450 Fahr
& increase in density
& approaches [illegible] of
Crystaline Variety [illegible]
[illegible]
$SbCl_3$ [illegible]
of the [illegible]
[illegible]

Wea. SUN. SEPT. 28, 1902 Ther.

Acid Solution [illegible]
Sb deposits [illegible]
violently and [illegible]
[illegible] power

addition of [illegible] acid
[illegible] to Sb trichloride
in HCl prevents the
decomposition by H_2O

Trisulfide Sb sol in
[illegible] Sulphide

Wea. MONDAY 29 Ther.

KOH forms a [illegible] of
trioxide Sb sol in
large excess

Carb K ~~[illegible]~~ precipitates
Sol in excess but [illegible]
after a while –
if however the Sol contains
Tartaric a the precip

Wea. TUES. SEPT. 30, 1902 Ther.

formed by KOH [illegible]
in excess of the KOH.

Tartrate of SbK as
Tartar Emetic

Copper [illegible] Sb in brilliant
metallic film
dis by K permanganate

Sb fluoride [illegible] H_2O
without decomp

Wea. WED. OCT. 1 Ther.

Triox Sb dis freely
in Acid tartrate K

Antimonate of lithia
[illegible] Sol of LiCl with
K antimoniate [illegible]
[illegible]

Wea. THUR. OCT. 2, 1902 Ther.

[illegible] Antimony [illegible]
[illegible] in [illegible]

2 pts Carb K to 1 pt SbS
[illegible] PbS heat [illegible]
melt it [illegible]
12% Sb [illegible]
[illegible] liver of Sb
which deliquescent [illegible]
perfectly [illegible]

SbS sol in KOH. —

Wea. FRIDAY 3 Ther.

Liver of Sb sol water

Pentasulphide Sb sol
Easily H_2O

Get 20 lbs Antimony
— Try Cylinder wrapped outside
with asbestos & dip in
Vessel of melted Sb to
chill a record on inside —
Solder ends in —

Wea. SAT. OCT. 4, 1902 Ther.

polish the cylinder inside &
leave it thick 3/16 - a Cold.

Use Copper drum reduce
film of antimony on it
from Tartrate Sb & K —

[illegible] Chloride
Sb in HCl [illegible]
pharmaceutical purposes
Sb is deposited on following
metals dipped in the Sol
Zn B. Sn Pb. Brass. German Silver

Wea. SUNDAY 5 Ther.

Arsenic deposited on
Copper by immersion
Dis arsenious acid in
warm dilute HCl.

Wea. MON. OCT. 6, 1902 Ther.

[illegible] HCl [illegible]

[illegible] Sb [illegible]

[illegible]

[illegible] sol [illegible]

[illegible]

The sol [illegible] yields [illegible]

[illegible] $SbCl_3$ [illegible]

[illegible]

Wea. TUESDAY 7 Ther.

Mix 2 lbs H_2O 4 lbs HCl
8 lbs Tartaric acid —
Says this is the best of all
Sb plating sol — where is
the Sb — or does he mean
to dis tartrate of Antimony (tartar emetic)
in it — I guess this is
what is meant,
buttermilk strong sol

Wea. WED. OCT. 8, 1902 Ther.

Says keep often moving, can use
strong currents without bad
plating & can deposit 1/4"
thick

Coating of Copper by simple
immersion
Dis 1 oz $SbCl_3$ in 1 pint
alcohol add HCl until
liquid clear. in 1/2 hour
Copper receives bright Coat

Wea. THURSDAY 9 Ther.

Try Reg mix of pickle Ni
812 on Round Carbon
plated Ni also Ni
& Cobalt plate over that

Try thin plate of
Antimony over Copper
or sheet itself if it
will stand OH in KOH

Wea. FRI. OCT. 10, 1902 Ther.

Antimony Completely Volatilizes at 1300 Cent.

When excess of Sb tri ox is boiled with a [illegible] Sol of Tartaric acid 1 Mol of the oxide dis[solves] for every 5 Mol of the acid present and [illegible] must not be too dilute, [illegible] to dry

Sb_2S_3

~~Sb~~ Sol Na_2S, mix with

Wea. SATURDAY 11 Ther.

NaCl to increase Conductivity [illegible] density of Current depend to produce or [illegible] [illegible] – too much Na_2S is to be avoided, [illegible]

Reo –

Highly soluble potassium antimonious fluoride –

Wea. SUN. OCT. 12, 1902 Ther.

Oxalate Sb + K Sol

If Cl [illegible] of a strength of not more than 7 per cent deposits [illegible] Sb – but additional $SbCl_3$ causes it to [illegible]

When a Sol of Antimony [illegible] containing free acid is [illegible]

Wea. MONDAY 13. Ther.

it will [illegible] also more Sb –

[illegible] Sb_2S_5 [illegible] [illegible]

Dangler [illegible]

250 Vol 7 9 [illegible]

Secondary [illegible] Hot HCl [illegible] –

Wea. TUES. OCT. 14, 1902 Ther.

Hydrofluoric a[illegible] even dilute
rapidly dis[solves] crystal[ize]d as
amorphous Antimony Oxi[de]
& the solution unlike
[illegible] Sb salts is not
decomp by water
Can be evap to crystal[liz]e

[illegible]
St Francois Co
[illegible]

Wea. WEDNESDAY 15 Ther.

Holland Reverse
one of the p[illegible]
of the 10c [illegible]
[illegible] of [illegible] back-

Try dipping drum
in [illegible] Each time
[illegible] of [illegible]
in Co for 30 sec

Wea. THUR. OCT. 16, 1902 Ther.

also in Cu same -
also try. Chlorate of
Cu - Acetate Cu
Formate, Cu
Double Oxalate, Cu
Trichloroacetate Cu

Move up & down & take out
when getting in solution
of Cu
also try Chlorine in
Cu

Wea. FRIDAY 17 Ther.

also piece of [illegible]
[illegible] -
try [illegible] Cu
[illegible], etc
Ethyl Sulphate Cu
[illegible]
Try [illegible] Cu in
[illegible] Sol[illegible]

Wea. SAT. OCT. 18, 1902 Ther.

perhaps gas made
by acid in Cu
attacking the Co
Try Boric
Etc

ask John Ott
what has become
of that large Cyl
high priced phono

Wea. ~~SUNDAY 19~~ Ther.

It may be that KOH combines
with Ni flake & is then unsoluble
or something in the KOH itself
or from the Iron or the OH/ [illegible]
Combine with Ni or Co flake
& not being soluble in KOH
after combin makes bad
contact —

Wea. MON. OCT. 20, 1902 Ther.

Take up with [illegible] & [illegible]
about going ahead with steel
Rolling plant bottom story
new bldg —

Experiment [illegible] [illegible]
oil — [illegible] — [illegible]
[illegible]

Consolidated Nickel Mines
Co. is to treat their ores at

Wea. TUESDAY 21 Ther.

the Smelting Co of
Australia at
Dapto New South Wales
1904

Deposit of Nickel & Co
in Lehmi Co Idaho
60 tons shipped as sample
therefrom 1905 nothing
in 1903

Wea. WED. OCT. 22, 1902 Ther.

Standard Con Co mine
Grant Co Oregon

Si	47.81
S	4.47
As	20.18
Fe_2O_3	17.26
Al_2O_3	0.12
CaO	2.85
CO_2	1.94
Cobalt	6.54
Nickel	.75
Gold	0.017
Ag	0.0028

Wea. THURSDAY 23 Ther.

101-7498

Co is information [illegible]

Some Ni ores from development
work on mines in
Hemlock, Floyd Co Va
& near Webster
Jackson Co NC

Wea. FRI. OCT. 24, 1902 Ther.

See arsenic works method
US Gel Rep 1903

US Arsenic Mines Co
now [illegible] Reward Post office
Floyd Co Va Forsythe gold mine

Alabama [illegible]
[illegible]

~~Write Commissioner~~
~~of Mining Denver~~
~~Colorado if he~~
~~knows anything about~~
~~The Sterling Mining Co~~
~~mines Gunnison Co~~
~~Col~~

Wea. SATURDAY 25 Ther.

~~[illegible]~~
~~[illegible]~~
[illegible] of [illegible]

~~Also write to Comm Min~~
~~Utah, if he knows of~~
~~any smelters producing~~
~~speiss carrying~~
~~Cobalt~~

Mn ores occur in
Bibb Co near Woodstock
Ala - in [illegible]
at Stocks Mills Cherokee
Co ala.

Georgia -
Cartersville District.
also Cave Springs Floyd Co Ga
Dade mines [illegible]
4½ miles NE of Cartersville
Clay deposited
Large quantities of [illegible]

Wea. MONDAY 27 Ther.

grade ore - [illegible]
also Etowah property
big deposits

N Carolina
Madison Co - near Warm
Springs - continuous belt
of Mn ore 8 miles long
1 to 3 wide -
Light Blue Mn ore

also Caldwell Co,
5 miles west of Lenoir
also Parkers [illegible],
10 miles W of Lenoir
also 10 mi north of
Dobson in Surry Co
NC
also ½ mile W of Blue
Ridge gap - McDowell
Co - seam 2 to 4" thick

Wea. WEDNESDAY 29 Ther.

Entirely

also in Nash Co
a Jackson Co.
Chatham Co

Series of bodies of
Mn ore associated
with Kings Mt Slates
in Gaston, Lincoln
& Catawba Co which are
superficially changed to Mn

Wea. THUR. OCT. 30, 1902 Ther.

one [illegible] locality
near old forge on
Crowders Creek
on W bank of Crowders
[illegible]

S Carolina
[illegible] lands near
McCormick SC

Wea. FRIDAY 31 Ther.

Tenn
Hickman
also Green Co with [illegible]
at intervals at the foot
of the [illegible] Eastern Mountains
(Unakas) all the way
from Va to Ga

Wea. SAT. NOV. 1, 1902 Ther.

then found all down the
Chilhowee Mt range
[illegible]
Six miles from Elizabethtown
Carter Co.

In the Triassic rocks
near Clinton, Hunterdon
Co N.J. There [illegible]
[illegible]

Wea. SUNDAY 2 Ther.

[illegible] 47% [illegible]
7% [illegible] .25% [illegible]
[illegible]
[illegible]
Cobalt 0.65
also found in the
Triassic Traps

Wea. MON. NOV. 3, 1902 Ther.

Arsenide Co[illegible] [illegible] in Kelsey mine at Compton Los Angeles Co Cal. [illegible] [illegible] [illegible] [illegible] [illegible] no work done [illegible] samples [illegible]

in N Carolina [illegible] is found in Cherokee Co [illegible]

Wea. TUESDAY 4 Ther.

S Carolina
Hard Labor Creek
& at Dorris Mine –

Etowah is in Bartow Co Ga –

Wea. WED. NOV. 5, 1902 Ther.

Woodstock Station [illegible]
Calhoun Co Ala [illegible]

[illegible]

Wea. THURSDAY 6 Ther.

[illegible]

Wea. FRI. NOV. 7, 1902 Ther.

The Gem & Clear Mines near Ghost Cliffs Colorado contain Ni minerals & small amount Co

Co with Nicolite in Grant Co New Mex at Bullards Peak.

Wea. SATURDAY 8 Ther.

Chloride, Pinos [illegible] Mountains

Also Ludwig & Carters Mines (Copper) near Masons Valley Esmeralda Co Nevada

Wea. SUN. NOV. 9, 1902 Ther.

disseminated, black & contains 4 to 8% Cobalt —

At Dracut near Lowell in Middlesex Co Mass Vein of Nickeliferous pyrrhotite opened, Co [illegible] works failed, perhaps this is the Chamberlain [illegible] mine. This was good Co — [illegible] about 1877 [illegible] opened —

Wea. MONDAY 10 Ther.

Nova Scotia

At Bathurst near Shepody Mountain at Quaco & Upham at especially the latter place near source of Hammond River was so very abundant

Wea. Massachusetts TUES. NOV. 11, 1902 Ther.

Wad occurs. foot thick
Covered with only few
inches of soil West
of the Connecticut River
it is seen everywhere in
the primary rock region
Especially in Leverett
Whately & Conway
occurs in low places

Wea. Mass WEDNESDAY 12 Ther.

in Plainfield in
Talcose slate used
Manganese

at Conway Vein black ox
Manganese [illegible]
wide - S E part of
town Quartz gangue
Mn not very abundant
on surface -

Wea. THUR. NOV. 13, 1902 Ther.

Not explored think
be found large quantities
Extensive bed or vein
on top of a hill in
Hinsdale NH,
adjacent rocks not
visible -

also bet 1 & 2 m E of
Center of Village of
Winchester NH.

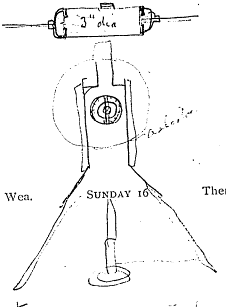
Wea. FRIDAY 14 Ther.

Black ox Mn

We noticed at Sharon
Roads ballasted
with Cobalt blue slag
better investigate Salisbury
Region -

Wea. SAT. NOV. 15, 1902 Ther.

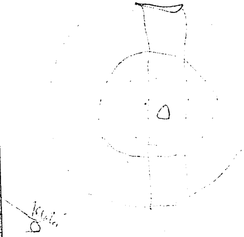
John Ott make a Roaster



Wea. SUNDAY 16 Ther.

To roast pyrites etc for Cobalt Separation —

Wea. MON. NOV. 17, 1902 Ther.



Wea. TUESDAY 18 Ther.

Have Dr Try Herreshoff Sulphate process on ce 0.60 Wad Ore or RDC for 50 mesh Crush & 100 mesh Crush 24 hours, insufficient Sulphate see what effect is —

Wea. WED. NOV. 19, 1902 Ther.

Write Edward F Pittman
Govt Geologist
Sidney
New South Wales
for Copy [illegible]
of he has maps of
patented + unpatented
Locations same as
Canada also of

Wea. THURSDAY 20 Ther.

The Cobalt was
districts are fairly
well open for prospect
or taken generally
Also Write our
Rhone man get
details
of 504 [illegible] in Sidney
[illegible]

Wea. FRI. NOV. 21, 1902 Ther.

Coal + coke to
Bungoma also Port
Macquarie. [illegible] —
of [illegible] there, [illegible]
[illegible] + [illegible]
are plentiful [illegible] Either
place or near there
or [illegible] pyrites [illegible] —
Laborers pay — Miners pay
Board etc,

Wea. SATURDAY 22 Ther.

Make some oval
tubes with rings
+ Let them Expand to
round —

Order some Syrup of
Glucose, also some
more C P Solid
glucose,

Wea. SUN. NOV. 23, 1902 Ther.

Casting to plate
Some Anodes from
Strong Chlorine sol
also some Copper from
Chlorine sol at very
low voltage –

from these anodes
Small cell flake will
be plated to look
if Cl anodes +
Solution will make
the product without
or with Chlorine –

Wea. MONDAY 24 Ther.

Bergman to have
Nickel + Fe mix shipped
at rate 50 cells
for 6 weeks
then 100 cells old
mix

Wea. TUES. NOV. 25, 1902 Ther.

order new 300 Ton
Hydraulic for flake

Sufficient Acetylene
Welders for Glen Ridge

also Bergman new
Iron filler –

Bergman to get
drawings new
tube filler – tube
drawing – rings –
Ends + grid –

Wea. WEDNESDAY 26 Ther.

Order Copper drums

Design Soaking Tanks
for flake – K Cy
(washing etc)

Sheer made good
also good chopper

Wea. THUR. NOV. 27, 1902 Ther.

Test Little Ro...
for Nathan ... Co
...
Leach down mill,

Wiley Come to arrange
see about 6% ...
Silica ... our slow
set cement,

Johnny about money
for Cement ... away -

Wea. FRIDAY 28 Ther.

Put bonds of NY patent
Co stock away
write in name for
transfer -

Wea. SAT. NOV. 29, 1902 Ther.

arrange Bergman ...
some ... stock
2 Lock ... cost
until we get going
here -

John ... about
test
Chains for Cement
Continue test with
their present chain
against new ones -

Wea. SUNDAY 30 Ther.

Weber about closing
End 10 ft ... & put
in steam heat
so we can occupy
new bldg -

Wea.	MON. DEC. 1, 1902	Ther.

Wea.	TUESDAY 2	Ther.

Wea.	WED. DEC. 3, 1902	Ther.

G G Kichline
Palmdale
Los Angeles Co
Cal -
Gave samples Co
ores -

Wea.	~~THURSDAY 4~~	Ther.

RDC - 1076 - 1078 1077
Was 20 ft thick
1/2 mile long

Wea. FRI. DEC. 5, 1902 Ther.

~~group about 6 Max~~
~~water - good - flake~~
~~4000 gluc~~

—

~~group about 6~~
~~Max ammonia~~
~~good flake 4000 g~~

—

~~Reg group 21650~~
~~Macassar dance~~

Wea. SATURDAY 6 Ther.

~~thick as glucose~~

—

~~Reg group soaked~~
~~only once 12 hours~~

~~group put right~~
~~in hot soaked~~

Wea. SUN. DEC. 7, 1902 Ther.

~~group green put~~
~~in strong KOH 24~~
~~hours dried out~~

~~group in 7 1%~~
~~KOH, 24 hours~~
~~rinsed~~

—

25% Cobalt
precipd with
Fe - showed work
as green pole
wetted Hg the
Co never absorbing
them acts as
a Conductor —

Wea. MONDAY 8 Ther.

Wea. TUES. DEC. 9, 1902 Ther.

~~group Double number groups on after plating —~~

~~group to run in 15% NaOH~~

~~[illegible] 21% NaOH~~

Wea. WEDNESDAY 10 Ther.

~~group run in 15% NaOH~~

Select 1/2 doz discard tubes soak out dry & then use the mix with 7000 Co flake mix 4000 & pack in fresh tubes (of flakes) run up on belt [illegible] to [illegible] [illegible]

Wea. THUR. DEC. 11, 1902 Ther.

group 5000 glucose 9000 flake
" 6000 " "
" 7000 " "

Patent mkg flake by flaking Ni Co Ni Co dissolving out Ni by KCy —

Make some flake Co sheet 0001 00005

Wea. FRIDAY 12 Ther.

Run thro Hydrogen & test on OH side in KOH, for endurance — ditto not run thro H ditto run in Nitrogen — ditto in H at high temp

group 1/2/1000 Co plated tubes on each side instead of 1/4/1000 —

Wea. SAT. DEC. 13, 1902 Ther.

Dumps at Cement, fix hopper
so belt gets dust 1st then
Coarse free on top – lost this
reason top 6 lower who better
than 132 with same 5' dumps –

~~group without ta[illegible]~~
~~group soaked [illegible]~~
~~in 21 [illegible] chg~~

Wea. SUNDAY 14 Ther.

~~Group thru 50 all fines in~~
~~" " 60 "~~
~~80~~ $\Big\}$ ~~450 glue~~
~~100 " "~~
~~9000 flake –~~

Wea. MON. DEC. 15, 1902 Ther.

Take regular irons charge
& discharge, one or 2 times
or take old irons from
discards, – charge fully
soak out in alcohol,
& press 250 at most
also if dont heat dry out
in air & press if heat
dry out in Vac & press
also try both Reg Hg [illegible]
& new Cutting [illegible] –

Wea. TUESDAY 16 Ther.

Try pyrophoric iron from
[illegible] [illegible] [illegible] blue

Precip Manganese & Nickel
together 10% Mn(OH) –
test in tubes getting
out MnO_2 by changing
KOH until all [illegible],

Wea. WED. DEC. 17, 1902 Ther.

350-1-2 1901 ~~900 KOH~~ Cop plate tubes 4500 g

353-4-5 " ~~1Hr 20~~ " "

Try acetone in soluble amalgamate the Zn dissolve first in the KOH, the acetone holding it in sol — or better add mercuric Cl to the KOH containing acetone — this will keep the reduced Cu & also Zn amalgamated —

Try Cells with acetone (like group)

Wea. THURSDAY 18 Ther.

in KOH, see if effect the by heating it gets to a dark yellow this might be [illegible] for soluble Eng —

Wea. FRI. DEC. 19, 1902 Ther.

to get porosity in the [illegible] OH, precip something with it which may sublimates at low temp like Camphor alizarin, Napthaline —

precip Ni SO4 - Hydrate - by NaOH, dry, percolate then - percolate with weak KOH & acetone to dissolve the H_2O —

Wea. SATURDAY 20 Ther.

Take old iron plate & dissolve out KOH, then dry & remove the Fe - powder & make new Cakes, run also with Cells q new ones

Make old & new from in tubes - Chg & dis - then Corrugated at 125 & to Consolidate run in again dischg fully · get KOH out & Re Cor to 250 at

Wea. SUN. DEC. 21, 1902 Ther.

350-1-2- greenline 20 fine in Co flake thru 15 - 4500 glue
Cobalt lower - 50 T rings broken before pkg —

353-4-5 21 oz absorbed 22000, 9000 Co flake - 50 D T
rings none before pkg 4500 glue Co plated.

356-7-8 gra 21950, thru 20 fine all in, Ni plated T
50 DT - 4500 glue - lot ~~[illegible]~~

Perhaps best thing to mix with $Ni(OH)_2$ for porosity is a Sulphate of an organic base insol in KOH in water but sol in Organic Solvents, The Ni Sulf & organic Sulphate precip. for instance Sulphate Naphthaline

Wea. MONDAY 22 Ther.

&c, on account of great atomic wt very little of Organic base make large porosity —

Chl ammonia at high temp decomp & form Chlorides but no Carbon with any decomposition Wood

Wea. TUES. DEC. 23, 1902 Ther.

Ralph to make some $Ni(OH)_2$ with all the precip salts left in — for test with tube cells 200 grms ea —

Mix Fe mix with Cobalt flake, mount in flat pkts. 250 1st.

get doz old Ni plates & use micro

Wea. WEDNESDAY 24 Ther.

Collect those red yellow Crystals to Dr Cram [illegible]

Mercuric ox combines with Lime forms slightly sol salt may be one we have in Ni pkts only Ba method

Wea. THUR. DEC. 25, 1902 Ther.

Group 4500 2/10000
thick - 4000 glu
21000 absorbed to ——
50 lumps Co plated

drop Ni plated -
also 6000 flake - 2/10000

Make Nickel flake by
Cu Ni Cu Ni etc
dis Cu by acid or
Wea. FRIDAY 26 Ther.
H_2O_2 also Sulfide
+ Hypo - H_2O_2 etc -
also HS - very acid
Solution - which causes
CuS to dissolve - also
anode in KOH with
Tannin, Salicylic etc
also plate Ni Fe,
Ni Fe - dis Fe acid
use Chlorine

Wea. SAT. DEC. 27, 1902 Ther.

1 Group Reg 21000
absorbed to 22000 Co plated
good flake 4000 glue
ditto Ni plate.

2 Drop 21000 absorbed to
22500 - Co & Drop Ni plated

3 Drop 21000 absorbed to
23000 - both Ni & Co
plated lubes -

Wea. SUNDAY 28 Ther.
4 Drop these with
2500 glue -
all No 1 2 3 4 to
have green thro
40 mesh -
Drop the whole
batch again
through 80 mesh

Wea. MON. DEC. 29, 1902 Ther.

Record in big Experimental book to try in Embolograph with Carb Strontia, every kind of liquid) other than KOH. which will not act on the Sr Carb -

glycerine Camphor Fe chloride also Cu to dissolve in KOH - try group with 250 mlg glycerine

Wea. TUESDAY 30 Ther.

also group with ~~250~~ 500 mlg glucose

Ask Ralph How peroxide Barium do for getting rid Co & Fe_2O_3 at same time - to also charge -

Wea. WED. DEC. 31, 1902 Ther.

group of Ni & Co plated in 21% KOH, made by precip K Sulfate in Ni Vessels by BaOH,

Series of groups in [illegible] 4000 [illegible] [illegible] 9000 [illegible] 20 40 60 80 [illegible]

NOTES FOR 1903

dis Chl Ni in 95% Ethyl also Methyl Alcohol precip by Alcoholic Na [illegible] Chl Ni [illegible] with [illegible] groups

Name | Residence

group thru 60 – 9000
4000 or 4500 – 100
Single tamps –
also group 75 single

Big lot say 3 times 21000
thru 40 + 4500 – 9000
Ni tubes + Co tubes –
Filled in tubes by funnel

group Ni Co tubes –
[illegible] to 21600 –
4000 + 9000 thru 40 mesh
but mixed a long time to
distribute grain

also [illegible] 22000
mixed long while –
thru 40 –

group Reg 4000 9000
21000 [illegible] – 50 T.
Soak Hot old way 1 $\frac{1}{2}$ KOH

Name | Residence

ditto Dup. but 135 in
21% KOH –

Group Reg run in 10% KOH
10% NaOH –

group Keep this way maybe

before plating –

group Red percolate out
then dried – then Run Reg
ditto Ni plated –

ditto after drying
Soak Conc NiCl in
Methyl al. – dry +
then plat in 135 Temp
21% – get Cl out
group Ni pickle –

ditto - soaked Bismuth Solution -

Group having its green soaked in a sol Bismuth sol, then boiled KOH, think chl Bi is sol absolute ~~[illegible]~~ alcohol -

Flouride Bi Solu in water not decomposed by H_2O

If infer - Bromide Bismuth solu Ether (1c) Tribromide, by adding Metal Bi to mix of equal pts Bromine & anhydrous Ether

Fred Ott. Use KOH & [illegible] group [illegible] old way

also group with water

Important - Try Edison

Take out the ~~[illegible]~~ one Ni flake group that had rings on & Boil them - 15% KOH + then ~~[illegible]~~ put back rerun - ~~[illegible]~~ The

other group put in 1% KCy for little while -

Make 9 tubes with green only Co plated tubes + Drip of 9 tubes Ni plated tubes green only - Rings on To determine if ~~[illegible]~~ [illegible] has anything to do with it -

Examine No. 63 445

Group Reg 21000 good 4000 - Single Temp Co tubes, 6 in group I Drip Ni plated 6 in group -

Soak hot couple descends Carbons
in old boat Hypophosphorous +
also, Arsenite + one other that
gave best results before —

Heat green in KOH, 21% containing
~~2%~~ Iodide K to 135 [illegible]
see if changes color — say 2% KI
ditto 2 or 3 grms. Aluminum.
ditto H_2O in acetone in KOH,
ditto Silicate K + H_2O —
If change color probly Carbon —

Fe pale in KOH, Vanadium
Salt strong — ~~[illegible]~~
~~so~~ act probly as rectifier

Wad — powder put in KOH,
pass chlorine to peroxidize
Mn + free the Co Ni —
wash & dis by ammonia
also by H_2O_2 +, then
Exhaust ammonia —

Green made by $NiCl_2$ in
Methyl precip by NaOH in
Methyl — recover + dry
then wash hot water —

ditto Ethyl precip —
also in Amyl different water images
but mixed.

also other liquids
organic in alcohols
$NiCl_2$ soluble —
glycerine, Etc —

aluminum hydrox dis in
Methylamine but not in
ammonia — Ni Co Cd don't
dis — see if Copper does —

Sodium Hexametaphosphate
Sol alcohol, dries to gummy
mass from water + [illegible]
in alcohol. Bender

Sodium Tetrametaphosphate
thick gummy sol on Evap
transparent Colloidal
mass Bender

Arsenate sodium is used to
remove mordant base redu.
[illegible] from cloth —
Possibly it was the arsenate
action that improved the old
pockets removing the [illegible] —

Na Hypophosphite is very
sol in absolute alcohol
try this on old [illegible] tubes —
also try [illegible] this Ferric ox,
acid [illegible] not Nitrate

Quinone, this sub
has greatest power of
Crystallization known
Even if small quantities are
sublimed the crystals
are an inch long
dis in some quantity in
boiling (on cooling crysts) water & it is so
Volatile that even at ord temps
it sublimes from one side
of the vessel to the other
strong odor irritates eyes
Sol hot alc & Petroleum Spirit

Mix of Quinone & Quinol
Equal molecules forms
Quinhydrone, Most beautiful
Salt of Chemistry, Green
[illegible] O converts into
Quinone & Reducing agts into
Quinol — Battery
Quinone is a ~~peroxide~~ [illegible]
& a powerful oxydizing agt
is reduced to Quinol &
reoxydized to Quinone
Extremely easy —
Quinol is Comml
Hydroquinone. Soluble
is [illegible] Sol in H of water

Have tried all experim
all the old tubes & enter
them in My book I leave
at [illegible] —

to make Silicate K think
Can use solid KOH melted
& added the hard powdered
glass K Silicate, it will then
dissolve & solidify on
~~[illegible]~~ & Can then be
ground up for Colorado
at Silver Lake,
or NaOH + K Silicate done
same way

In making nickel [illegible]
will not H_2O_2 or some
oxidizing agent like it turn
CuS to Sulphate [illegible]
& Soluble
How about perchromates
H_2SO_4 Sol [illegible]

Hypochlorite [illegible]
possibly Sulphurize the [illegible]
& allow it [illegible]
Hypo Lime –

Fuse acid Sulphate K
add ferric oxide –
Then Roasted Arsenide
Raise heat till no more
white fumes comes off

Result Sulphate Co Ni
which not decomposed
at Red heat &
Arsenite Iron which
when all SO_3 driven off
is absolutely insol
in the neutral Solution
its insol in all
Neutral Sols –

~~[illegible]~~ Lixivate &
precip by Carb K –
The Sulph K of Co,
Removal Co Ni
made Bi Sulfate
again & used over
no arsenic Even by N.S.

MEMORANDA

Date | Dolls. Cts.

if mixed Chlorides of Mn
Co & Ni are ignited +
a stream of Hydrogen
is passed the Co & Ni are
reduced to the Metallic
state, giving off HCl --
whereas the MnCl2
is not effected,

Statement in Watts
on Mn = Sep from Ni Co

with water, whole dis
in HCl, evap + put
in Cylinder ignited
+ H passed - HCl absorb
in water -

Whole dissolved in
Water a Mn + FeCl ete.
therefrom - leaving
Silica, Co Ni Etc.

MEMORANDA

Date | Dolls. Cts.

The MnCl + FeCl ignited
in aqueous Vapor to
decomposed to HCl
which used in fresh
batch.

The Si Co Ni dis
by HCl. made anhydrous
or Co separated by
acetone, both
ignited in H to
get back HCl,

No loss HCl - by
this process -

H made by ~~...~~
Reducing Fe2O3 by
CO then passing
Water Vapor -
then CO Etc -

Date | Drawers | Time

Roasted Arsenides Co —
Roasted (HCl) while HS —
passing. As sulphide
volatilizing & sulfur.
Fe Co Ni remain —

to obtain HS pass H over
pyrrhotite hot gives
HS & protosulphide.

Separation Ni & Co —
reduce by Hydrogen
to metal pyrophoric
Let in KCy dissolves
the Nickel — this
is better & cheaper
than [illegible]

No. | Where Payable | Due | Amount

Gas retort briquette
possibly pass H —
Bricks previously coat
with protosulphide Mn from
which Co Ni been group
by HS Sol neutral by
Carb Mn — This group
elements a group & [illegible]
for briquetting — heat
to red in retort with
superheated steam
going in —
Exhaust by [illegible]
Keep by HS in [illegible]
Sol. Sol. in partly
Ore itself be [illegible]
to keep sol neutral
if finely ground —
get HS by HCl &
pyrrhotite of MnS

Date	To whom given	Time

on ~~[illegible]~~ 1st 70 Hat, Corrugated
with rings on after plg seems to
gain most, - Try
2000 thro 40 -
9000 Cop plate - 4000 glue
Corgated 150 at rings on [illegible]
ditto Corrug 200
" " 250
" " 300

Think these obtained by
dippled - with Co & Ni
tubes - also Dip group
Run Cold -
also group thro 20
Co + Ni tubes -
Heat runs only -

above with Burs
outside - also
Reg thro 20, burrs outside

No.	Where Payable	Due	Amount

Group with Chlorate K
" Stannate K with
Albumen K
Humate K

Ni film on Cu - mix Chromic
acid & sulfuric, see if dis
Cu not Ni - ditto
Sul ac + perox hydrogen
also soak H S a little acid
& then Chromic & Sul acid,
H_2O_2 & Sul acid, alternately

~~[illegible]~~ -

Soak polysulfide K, H_2O_2
or Bichromate K - or
Permanganate K -

Date | Iron – | Received | Paid

Soak Red Fe in Sulphide
with Nitrate Bismuth,
Nitrate Bi or Nitrate Cu.
Nitrate Ni –
[illegible]

1/5 of 1/1000 Cobalt
flake – mix Fe Red
also Fe Red & Ag

Iron for igniting Nitrate
Chloride in air H_2O –
Prussian blue –
Cyprocyanide of Iron

Fe amalgam distill Hg off –

Plate Zn & Fe together
Eat out Zn by KOH. Hx.

Dont forget changing
Reg iron – Soak out
KOH by alcohol
dry & heaps to get
it more [illegible] – [illegible]. 5

Date | Received | Paid

dissolve Ferric Chl in alcohol
ditto KOH in alcohol
precip & boil – wash & test.
Try same with Ferrous
Chloride –

ditto FeCl ferric &
Cupric Chloride mixed
in alcohol & precip
by KOH in alcohol –

ditto Ferric Chl &
Cadmium Chloride
Mix wash & with Hg –
Possibly Fe & Cd
will work [illegible]
together,

Try Cd alone mixed
with Hg & [illegible],
also Cd & Bismuth,

Fe + Sb & Hg or not

Date | Received | Paid

Dyer patent new things on
New Roth -

group Nickels tube
packed by putting in
pinch green lamp
then pinch flake, lamp
& so on about 45
Sections, No Glucose —
Dip this group a Corrugate

group with Sulphide
Antimony 500 grm
in KOH each cell —
precipt'd Sulfide

group warm green then
Soak in conc Chloride
Ni & Methyl alcohol —
dry & then 9000 flake
4 glucose — put tube
in 1½% KOH, soak
out glucose a final
boil in 1½ KOH to
get rid Gasco Sulls —

Date | Received | Paid

ditto a group
9000 — 400 gl the soak
out dry — then soak
in Conc $NiCl_2$ in Methyl
once a group dry — then put
in KOH 50% — bring
nearly to boil —

dip above by Corrugating

Some groups Reg tubes —
good & [illegible] burns outside

2cc of Hyposulphite Soda
dissolves Copper
a double salt is formed — [illegible]
[illegible] in this book —
20 grms Hypo to litre dis
100 [illegible] Cu Sol Can be
continuously run through
the flake & Cu precip by KS
& Hypo regenerated —
& this is for Nickel flake on Copper

Try Silicate of Ammonia
in Lalande —

Date Received Paid

Group in Acetone —

Pass acetylene over Cu Co flake
& strips plate Copper —
Gas Co cant use Copper
pipe —

Make some green with
1 2 5 & 10% Cobalt
in it = test in tubes.

Group Reg Ni mixed with
graphite, 50 T.
also Conning [illegible] —
also with green — gray. c
& glucose —

Distill ferric chloride
to get it pure [illegible] [illegible]
Comp —
Then fractional distillation
& spectro to see if
there isnt more than 1
[illegible] ~~[illegible]~~

Date Received Paid

Get 2 or 3 lbs
Oxalate Iron absolutely
CP — & make some iron
Mix & CP Hg —
see if Economy improved

Series of groups of 3
Reg plts Ralphs New
process Iron —
No Hg — then 1% 2
3 5 7 10 15%

Dup with no Hg
1-3-5 10 15 25 Copper
33% 50% —

Dup 1 Cu 3 Hg — 5 Hg
7 & 10 Hg

Dup 3 Cu 3 Hg 5 7 & 10

Dup 5 Cu 3 5 7 & 10 Hg

Dup 10 Cu "
Dup 15 Cu "
Dup 25 Cu "
Dup 33 Cu
Dup 50 "

Date | Received | Paid

Dip 3 Bismuth, 5 7 10
15 25%

Dip Bi 5 Hg 3 5 + 10
" 7 "
" 10 "
15 "
25 "

Reduce some New Fe_2O_3
New process to Non-pyrophoric state, then use 15% Hg & test, 1 gram used washing by [illegible] + Repressing!

Dip above with Fe mixed with Copper same as Ralph Sulfide by equalizing then soak [illegible] + Requalizing

Date Think this OK Received
a good process
Dip & put Hg in as metal,

Hole 1 - 44" deep
Sample 1 44" down to Quicksand [illegible]
No 2 35" down
3 30 - This is iron
Cap - 4 - just above iron
Cap 24" down -

$1\frac{1}{2}$ is all bet 1 + 2 -
$2\frac{1}{2}$ is all " 2 + 3 -

The Holes 44" deep
Bottom of iron cap is 8" up from Quicksand
its 6 or 8" thick of which
$2\frac{1}{2}$" is black

Date | Received | Paid

Hole No 2 42 inch from top to Black Bluff —
Very black 6"
18 of dark brown —

altogether 66" deep —

No 1 is 18
2 6" black
3 36" streak sand
4 5" Top soil

group green moistened with NH_4 & NH_4Cl — then glucose

Reg group Ni & Co soaked with 5% ammonia (color inside) of KOH,

Date | Received | Paid

also group green absorbed ammonia 24 hours, Dry ammonia no water — Ni & Co

also absorbed wet NH_4 24 hours & later soaked over in 5% NH_4) Ni Co

group 4500 flake thro 50 — 4500 thro 20 — green thro 40 — Ni Co

Dup above green absorbed Dry NH_3 24 hours

Its probably NiO_2 reduces before any CoO_2 reduces hence CoO_2 would remain conductor until Ni used up — groups green 5% $CoOH$, 10% 20% 33% —

Date		Received	Paid

Make set of tubes to be Cast Apart with 30 40 50 60 70 + 80 mesh green - good flake + from these results make variation with dif mesh with less flake

group with Central tube 1/16 dia perforated - also solid. ~~& pull it out~~

Try plating Co on finished tubes

3 tubes

Date		Received	Paid

One box to run 160 degrees to test specials = groups to get quicker results & Comparisons

Soak dried groups in some organic Compound that will give OH, + the gases be set free

Groups pkd with tight fitting plungers

also group pkd with much smaller diam plungers than Reg

Date		Received	Paid

Write Sulphur Vessel
column [illegible] the
Beans put 3 times
as much [illegible]
as there any more
pages [illegible]

NaCl & NaSul - got out by
Chilling to 1° cent, when
4/5 of Sulph crystal[illegible]

[illegible]

Cash Account—July

Date		Received	Paid

[illegible] —

grind 21000 [illegible] of these
[illegible] of 4000 [illegible]
$3\frac{1}{2}$ lbs Ni Co [illegible]

ditto 4 lbs Ni Cobalt

" $4\frac{1}{2}$ Ni Cobalt

" 5 Ni Cobalt

grind Reg lot of
Co & Ni [illegible]
Play in bottle
48 or more hours

flat flake iron mix
mix Co flake with
mix —

Date	Received	Paid
Chicago Mil & St P gen'l 4s 1989	109½ Reg	112 asked
gen'l g. Se B 1989	97½	23 M
C & Northwestern g 3½ 1951	102 3/4	99 bid
		20 M
NY C & Hud RR g mtg 3½ 1997	97 7/8 R	
84 M	99 7/8 C	
West Shore g 4s	Reg 106	
	C 108	
Lake Shore g 3½ 1997	100 5/8 C	
50 M	99½ Reg	
NY & Harlem 3½ 1000 yrs	101¼ C bid	
	~~105~~ 1/8 C	
12 M	101½ bid	
Reading gen'l g 4s 1997	C 103 7/8	
66 M	Reg 102 3/4	
	bid 97	

groups Rosin soap — various [illegible] — alcohol

Date | Received | Paid

Group 40 Mesh

absorb dry ammonia

35 oz glue good

Co Abs High

press 1 scale

Rings on after

Group Reg KOH, Saturated with BaOH, + Excess put in -
Co Ni Lubes

Group Saturated KOH with Lime - Excess put in -
Co Ni Lubes

Group KOH Saturated with Carb Barytes + Excess
Co Ni

Ditto Sat with Carbonate Lime + Excess

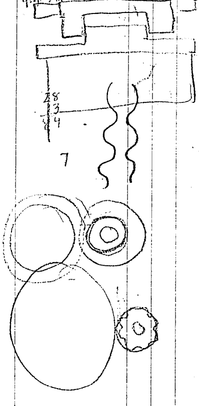
group with group [illegible] [illegible]

Burnt Marble

[illegible] CaO

Cash Account—September

Date		Received	Paid
	[illegible] 1100		
	[illegible] 1500		
	[illegible] 4800	7 m	
	[illegible] 4500		
	[illegible] 6-90 000		
	[illegible] 2 m 8000		



Cash Account—September

Date		Received	Paid

180
15
900
180
2700

446) 270000 (603
2676
2400

Cash Account—October

Date		Received	Paid
	950		
	475		
	475	3)712	
	665	237	
	712	9	
	162 | 990	Co 948	
	3 570	1 180	
	159 420	759	
	158 280	949	
	1 140	1708	
	162 530	1,440	
	4 250		
	158 280	2250	
	1,440		
	124 720	336	
	7 470	1344	
	117 250	1680	
		1680	
	123 330	1036	
	4 960	336	
	118 370	4536	
	117 250		
	1,120		

Cash Account—October

Date		Received	Paid
	Co Ni Sal		
	1,120		
	350 000	8750	
	50	200	
200	175 000	17,500,000	
	16 000		
	15 000		
	14 000	225 | 1946	336
	1,000,000	665	
		81	
	180	665	
	125	1450	
	900		
	36		
	1800		
	2250		

Cash Account—November

Date		Received	Paid

165
80
1320
35) 120 (3
105
356
27
2492
712
600
35
5660
270
32
4
128
35000 (273
256
160

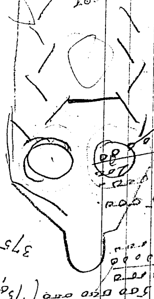
Cash Account—November

Date		Received	Paid

50
600
600 lbs
7200 lbs
2000) 720000 (360
260
260
15600
5200
67600
360
550) 1980 (3.60
80
250
250
12500
5000
62500
62500
68750

CASH ACCOUNT—DECEMBER

Date		Received	Paid
	446		
	3		
	1,338,000		
	97 000		
	50 000		
	1,485,000 160,000		
	45 000		
	12 000		
	1,000		
	1,543,000 150		
	1,578 1,200		
	200		



CASH ACCOUNT—DECEMBER

Date		Received	Paid
	382		
	70		
	26740 382		
	2		
	764		
	1990		
	192		
	398		
	3820		
	456) 76400 (165		
	456		
	3080		
	2736		
	244		

Summary

	Received	Paid
Cash on hand Jan. 1	6250	
January		
February		
March	6250	6250
April	307	
May	437	531
June	16750	
July	19181	
August	1926	
September	5313	
October	307	
November		
December	3719	
Total	15309	
Balance to new account	191	5313

1910

340

Calendar for 1903.

Jan.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
. .	. .	. .	. .	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Feb.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28

March.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31	. .	. .	. .	. .

April.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
. .	. .	. .	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	. .	. .

May.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
. .	. .	. .	. .	. .	1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	. .	. .	. .	. .	. .	. .

June.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
. .	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	. .	. .	. .	. .

July.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
. .	. .	. .	1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	. .

Aug.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
. .	. .	. .	. .	. .	. .	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	. .	. .	. .	. .	. .

Sept.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
. .	. .	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	. .	. .	. .

Oct.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
. .	. .	. .	. .	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

Nov.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	. .	. .	. .	. .	. .

Dec.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
. .	. .	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	. .	. .

45
15
225
45

690 —
3
2070

18000
6000
7000

180000 (5
4500

6253
552
500000
3185
3623

16000 (80000 (30

6 —

74

18000
5000
8000
32000 (180000 (56
160000
20000
192000

30,75

3.62

18000

6250
56
3750
3125
3,500

140

6250
937
5313
3.9

3719

6250
15

32000 (50000 (15
32000
180000

Notebook, PN-04-06-04

This pocket notebook was used by Edison during the period June-October 1904 for notes on experimental work to be performed. Among the experiments described are many that pertain to the chemical composition, construction, and electrical capacity of Edison's alkaline storage battery. In some cases Jonas W. Aylsworth is indicated as the proposed experimenter. Also included are several pages of rough calculations, a list of the number of employees working for various departments of the Edison Storage Battery Co., and a note about a worker at the Edison Phonograph Works. The front cover is stamped "Pass Book." The pages are unnumbered. Approximately 25 pages have been used.

RN-04-06-04

Corrugate pockets first then felt & crimp with very light corrugating pressure this will stiffen cup & at same time get porosity.

Run curves on Fe at 5 lake with various pressures to get variation possible

Run Fe in Hg cyanided cups or the usual to get cups amalgamated —

Pocket that works once good but by many charges has gone low try washing & drying boxes [illegible]

*

High chg v due to Na Voltage, form
Oxalate Ele Co + Fe Mn + Fe

2 clean inside + outside Hydrogenized
Cups placed in Cups filled with
HgO + put 24 hour KOH
with strip cups that had oil on
spots that would burn off + give
smoke also filled with HgO
Showed pale of amalgam with Clean
Cups + no amalgamation on the other
Cups where oil spots were
for high discharge this would be bad

Our cells having failed to give within
16 to 18% of what they should give, investigation
was made to find trouble
following is results.

1 Lack circulation - increased it —— no Effect
2 Greasy cups at normal rate —— "
3 " " hydrogenized —— "
4 Well washed cups at normal rate "
5 Cups nearly closed perf " "
6 Lot phosphates in KOH "
7 Lot HCl "

8 = Changing KOH 20% after Each charge   No Effect
9   "   "   " discharge   "
10   "   5%   "   "   "
11   "   "   Charge   "
12 Changing during overcharge in 5% KOH then 24 hour charge + reg discharge   no effect
13 Reversing Cells long time then Reg 24 hour Charge + reg discharge   "
14 Reversing Ni against Iron high rate then Reg Chg + Dis   Evens it up perhaps a little
15 Not allowing Ni Mix to absorb H_2O before briquetting or corrugating   No Effect
16 Taking a particular bad cell apart cleaning Cell + reassembly improved 20 amps but. Sudden cell that was bad as other done + it but changing KOH improved same amount = both these cells were in a lot of 40 + were very much better than the others - found in bad cell taken apart that the washer was not of proper steel -
17 made cell up of Ni plates Each plate being given reversed current of 200 amps for 10 minutes in 40% KOH, diluted 10/1000   No effect
Finally found trouble due to there not uneven filling ~~[illegible]~~ the ~~[illegible]~~ Nickel + probably dirty cups helped —

The Calipers of new plates showed they had less than 415 - as if mix varies there is no margin - Hereafter we keep the average above 416 that being minimum average + Ni must average 3.300
It may be possible that it was not lack of [illegible] that all the trouble was due as we changed our nickel filler so it would load the pockets perfectly even —
More [illegible] + even loading of nickel pockets produced cells 15 plate 144 [illegible]
There is only one way to fill Ni pockets even + that is by allowing mix to fill pocket naturally + by gravity. The scraper or a roller [illegible] [illegible] 1/2" dia fixed + not rotated, the roller giving Camming action + causes ne drag on big pieces leaves as smooth face — The mix must be sifted as pieces get mat scraper made soft ends
Care should be taken to keep lumps out of Mix at Chemical works as it causes uneven filling by causing bridging of filling hopper. also pieces of big mix

June 4 1904

Expts on charging Reg pockets
Standard mix which is 30 m a h Lower
than factory mix —

1 Fe 2 Ni - Little cell —

1 Charged 3 hours gave 915 to V average 1240
1 " 6 — 953
9 — 953
12 — 971
15 — 991
18 — 993
21 — 1011
24 — 1001
27 —
30 — 1033
36 — 1038

one reversed 24 hours & then chgd 24 hours
946 —

In charging used 200 m a for

	got		put in m a h
3 hours	got	221	600
6 "	"	505	1200
9 —		710	1800
12 —		818	2400
15 —		907	3000
18 —		950	3600
21 —		978	4200
24 —		981	4800
30 —		1018	6000
36 —		1026	7200

Calipering Expts 3.2 Ni

Dry mix not corrugated	79.6	102.3	97
" ~~corrugated~~	~~83~~	~~95~~	~~94~~
Mix 1 hour in air	78.6	92.6	98.6
" 3 " "	78	100	97

Filled pocket, loose put under bell jar with sponge warm 1½ hours

pressed flat —	76.7	96	95
Corrugated	83	95	94

Mix in loose pockets all night under bell jar then Corrugated

85	91	98
84	95	97

ditto smooth dre	76	95	97
	77	97	96

a hot pocket pressed hot & Corrugd hot
94.8 against 93 not hot,

When we lost capacity in cells at factory
Burr & some Valintine & not reg gang
made 12 cells both Fe & Ni plates out
night & Ran them right through — they were
fine all averaging 152 amp to volt
18 plate cell — 2 days afterwards
started again making some but they
were bad = probably cause was Burr
more evenly filled Ni pockets by
doing it himself & slower & got heavy
Fe plates — The test was principally

Jan 4 1904

to determine if fault was due to dirty Cups.

2 cells Outside + inside cups plated in the strip cupped in 1½% KOH Dried washed Naptha + Dried, Ordinary washing Results OK

3 Cells Outside + inside cups plated in strip, Cupped in KOH 1½% Dried washed Naptha + then washed very Clean Results OK

3 cells Outside + inside cups plated in strip cupped in 1½% KOH Dried washed Naptha Dried washed very clean annealed in hydrogen Results OK

4 Cells O + I cups plated in strip Cupped KOH, Dried washed Naptha dried ordinary washing annealed in hydrogen = Results OK

Jan 4 1904

6 special test cells Outside & inside cups plated in Cups old way ——— get result.

In charging we require the Voltage try AP in KOH so it will reduce. Coffee instead KOH & then lower charge Voltage

test charging economy on Cobalt [illegible] with Hg dope.

Look out for hollow bottom to inside pockets makes uneven loading

Look out for spatter of Nickel Solution on plated parts Hydrogen reduces to sulfide

June 4 1904

Oxid on copper turns them darker
If Cup held over Bunsen burner
1 1/2 from flame color disappears
& Cups become bright smoke
Comes off

If spots are due to ~~[illegible]~~
[illegible] solution & then passed
thro Hydrogen will be reduced
to sulphide of nickel &
will not come off above
flame but will come
off in Nitric acid

If Rust it will be red
before going through
Hydrogen & [illegible]
[illegible] being
reduced to Iron

June 4 1904

A good way to prove that Either
the Ni or Fe is insufficient
in a Cell which fails to
give proper Ampere Capacity
is to discharge to .75 Volt
& then Charge 1/2 the cells
say Nickel against the Can
for one hour & discharge
still further & the other
1/2 charge the Iron
[illegible] the Can for
same length time &
discharge further
if lack of Iron the
Ni which has been charged
one hour will give very
little & vice versa with
Iron — This is sure
Charging 2 hours makes
it certain

June 9 1904

33% KOH Causes nickel pockets to swell very much but not the Iron. The swelling is so great on Nickel that a pocket in 21% swells after say 10 Runs from .85 in Center to .100 – while in 33 it sometimes swells from 85 to 140, & in some cases pulls the pockets apart at the center at crimp

With battery having 5% KOH. the Capacity is much less & is practically void of Capacity below the freezing point

3.2 grms Ni mix in 20% has Capacity of 530 with 2 [illegible] 20% is effect. Considerably below freezing point. sometimes Capacity is ½ = With 33% 3.2 Ni gives as high as 750 to Volt & the Capacity is scarcely

June 9 1904

effected any below freezing but swell ~~the~~ pockets is unmanageable,

BaOH, [illegible] in KOH of cell does not appear to harm cell —

Carbonates & oxalates only hurt cell when in great amounts & then probably only by diminishing the KOH.

Other radicals like Cl SO_3 NO_3 appear to act to swell the nickel by forming the Colloidal Ni hydroxide in the pores —

Uneven packing of the nickel mix in the pockets is very bad as the whole should be under pressure & the light parts get

June 9 1904

scarcely any pressure the heavy parts on swelling raise the face of the cup & produce uneven pressure on the mix —

Dirty oily cups is bad for contact — placed clean cups & oily cups in KOH & filled with HgO — in 12 hours clean cup amalgamated & oily cup only amalg where there was no oil — It would be impossible for mix to make contact where HgO would not amalgamate with the current
Large current

Jan 11 1904

at charge rate of 75 mil amp per pocket a 18 plate cell at end 24 hours will showing Chg Voltage 1.78

50 per pocket	172.5
35 "	166.5
25 "	159.5
20 "	158.0
15 "	157.5
10 "	154.5

This shows that a charge per hour of

21.6	amp is forced in at end	24 hour at	178
14.4	"	"	172
10 —	"	"	166.5
7.2	"	"	159.5
5.75	"	"	158
4.3	"	"	157.5
2.8	"	"	154.5

Jan 11 1904

1st 2 hours

75 ma per pkt	169	2
50 "	167	3
35 "	164	4
25 "	160	2
20 "	158	4.5
15 "	153.5	2.5
10 "	151	

6 hours after

75	168	4
50	164	.05
35	163.5	
25	164.5	
20	165	7.5
15	157.5	4.5
10	153	

10 hours

75	180	changed
50	166	
35	163.5	
25	163.5	
20	164	4
15	160	
10	154	6

18 hours Jan 11 1904

75	180
50	178
35	168
25	163
20	162.5
15	164
10	157

Have ~~Noise~~ Charge at 10 20 & 30 ma + read V to Can to see which polar gives trouble

Try filling thro Lampblack Chalk & other precip to get foaming matter out KOH —

To test Radicals to be Tried battery add Hydrazine phenolphthalein Camphor Tartaric acid — Citric Ac

Jan 13 1904

100 seperators weight 130.300
made by Combn Rubber Co from
Monel 350 to 1 pound

Substances to be added to
KOH of Cell for Catalysis:
Saccharin - phenylhydrazine
Ammonia,
Tantalic acid,
Selenic acid,
Uranyl -
~~[illegible]~~ Turpentine
Aniline - pyridine -
~~[illegible]~~ Bromic acid Bromate K
Iodic a Iodate K
Cyanic a - Cyanide K
Formic a Formate
Ferrocyanide of K -
Cyanurate K
Nitric

Gave to [illegible]

Jan 13 1904
With scientific dope

Iron mix - Reduce by H,
precip or use oxalates
Cadmium - Copper Cerium
Bismuth - Cobalt Nickel,
Tungsten - Molybdenum,
Uranium - Vanadium, Sb -
Tin - ~~[illegible]~~ Silver - Chromium

Peruranate K Evolves O at
ord temp rapidly at 100 C -
made by adding H_2O_2 to a
Uranic salt peruranic hydroxide
precip - try this in battery
in place nickel

~~[illegible]~~

~~[illegible]~~

precip a little platinum with the iron (ie) with the Oxalate So will have Pt black in Fe of Battery [illegible] little nickel

Try - Phosphite K in battery list of bad solutions or Hypophosphite

If there are radicals or deleterious substances in the Ni or Fe plates reverse them in KOH with Ni sheet + gradually KOH [illegible] also change as well as reverse + change KOH in this way might get a pocket of with Ni Fe a [illegible] good results

Try parchment paper [illegible] 12" dia for purifying [illegible] of Colloids + [illegible]

Try 3 parts Hypo. K

~~[illegible]~~

Manganate K good ~~test~~ for metal oxides - precip when all precip ~~[illegible]~~ Solution Colorless, it better oxidize than permanganate as don't require heat

July 1st

Tool room 23
Press Room - 9
Perforating R 7
Burnishing Room 54 night
Plating Room 26 = 10 -
Assembling Room 14
Testing 4 2 night -
Inspecting 10 -
Stock Room 5 -
Power plant 2 2 night
Erecting & Management 11 -
Asst Mgr office 6
Supt office 4
Shop foreman 1
Auto dept 2
Draughtsman Carpenters 1 2
Machine Room 19 Cupping Mach. Drill presses & screw machine
Glass Cake 48.

Average Rate .1975 Hour

16 - 175 28 00
55 120 70 00
22 - 175 38 00
15 175 26 00
3 175 5.25
10 160 16.00
5 160 —
2 240 —
12 175 —
6 -
4
1 — 17 7
2
1
16 — 200 32
222

7 men for assembly
9 for timing

Oct 8 1904

Mix with black mix Fe some Cadmium Hydrox by rolling wet

also oxide aq - also $Co(OH)_2$ $SbOH$,
- cerium -
Try Reversing Fe in small cell with
2 pts of Radical say Cl - see if
it dont clean it so it will not gas
on charging thereafter

Oxidize surface of sheet iron see
Charging & discharging Voltage with
good [illegible] [illegible]

When get a good test Fe & Ni thin
Electrodes to test chg & dischg Voltage
Try KOH made in various ways
from K_2SO_4 - Metallic K, Chloride aq
& other ways - also Sodium there
may be impurities that cause a
higher chg Voltage ditto dischg
V=

Make some triple deposited
CP Electrolytic Iron from
3rd time crystalized sulphate
& make [illegible] of oxide surface
on these also act on the
current to get oxalate then
Red by H - see if chg Voltage
[illegible]

~~Sloan & Chase~~
~~920 Griswold~~
~~New Haven~~ ?

Specialty Dies -

~~Have Glenn note~~
~~forming Cells &~~
~~see if any relation~~
~~to Capacity~~

3 5 & 8 Amps
on E18 E27 E45
watching

Oct 8 1904

Our Hg may be impure or iron is
certainly impure & may have something
in which lines higher [illegible] Valley

150
150
25
25
150
90
90
20
40
185
77
52
40
115

350
45
60
43
43
60
75
75
43
310
310
60
80
80
115
115
115
115
10
20
20
40
40
33
32
2291

5

175
40
700

45
70
315
24

40) 750

306
33
32
32
40
30
45
280
30
33
32
15
25
75
84
64

745) 75600 (1
745
174

100 HP

7) 500
75

20
8
2

40	52
	13
"	14
—chk	26
	12
	11
	34
	21
35	49
20 gms	43
	20
Extra 15	15
	370

315
180
25200
315
36700

60000
60000
30000
60000

K Iodate, merks GR. ~~75~~c oz 2 oz

K Hypophosphite 3 oz 1.49 lb

K Phosphite, 2 oz 49c oz

250
175
425
575
1000

50
6
3000

1200 / 24
1000
2000

350
175
575

John A Williams
Box 18 — [illegible] bldg 21 at Phone
[illegible] 3 yrs
[illegible]

Notebook, PN-04-07-21

This pocket notebook was used by Edison and an unidentified employee, probably during the summer of 1904. Many of the entries relate to production costs for Edison's alkaline storage battery. Included are labor distribution figures and notes on piecework rates, materials, and other manufacturing costs. There are some similar figures for the Edison Portland Cement Co. In addition, the book contains entries by Edison regarding experiments to be performed, including work on storage batteries and a Lansden electric vehicle. Also included is a list of machinery necessary for manufacturing rubber parts. Inserted into the book is a report on labor and material costs at the Edison Storage Battery Co. works in Glen Ridge, New Jersey, for the week ending July 13, 1904, along with 2 pages of loose notes. The front cover is stamped with the British royal crest. The pages are unnumbered, and several pages have been removed from the book. Approximately 50 pages have been used.

PN-04-07-21

Nickel mix per 18 plate Cell
on 6 ozs 3.420 per pocket,
985 grammes or 2.2 lbs

Iron 1.75 lbs per 18 plate Cell,
4.9 per pocket
E

KOH 21% solution in 18 plate
Cell 1200 CC,
solid KOH in this solution
297 grammes .6 tenths of lb-
[illegible] 27 + 45-
E

Weight of Seperator
1.2 grms each
Weight of 75/1000 sliced
seperators 1 gram
Each-
E

Weights –

18 plate, side rubbers weight. pair 38.5 grains

" " ~~Side sheets~~ Cost per

" Side rubber sheets "

" Cost – "

" Bottom rubber weight 24 grns

Cost, per lb

Rubbers hard in electrodes weight

Cost, per lb

Rubbers soft in electrodes weight

Cost per lb

Thumbnut rubber posts wt – pair 6.9 grs

Cost, per lb

Rubber soft on filler wt

Cost, per lb

Rubber bottoms, wt

Cost, per lb

Rubber diskopast wt

Cost per lb.

Crate guides separators wt Cost

Total wt Cost per lb Total Cost

Chemical wks.

		rate	week
1	Watchman —	18c	$16
1	foreman day	20c	16 80
1	" Night	20c	16 80
1	Foreman — Savoy - Gout		24 00
1	Foreman Fe + annealing —		23 50
1	Foreman No 2 - Wq - Ni, grafelops		12 00
1	Time + book keeper		12 00
1	Storeroom		15 00
1	Chemist		25 00
1	asst Chemist		12 00
1	~~Test~~ cup maker + running		8 00
1	Errand boy		5 00
	~~Inspector~~		
1	Test man		12 00
1	"		9 00
1	"		10 00
1	"		7 00
1	Machinist — 32.5		
1	Pipe fitter, 22.5		
1	2nd grade Machinist 20c		
1	temporary Machinist for lab.		

Chem Wks Continued.

No 2 bldg

~~[illegible]~~

1 Laborer –		15
1 "		15
1 "	Σ	15
1. "		17.5

No 5 main bldg –

7 Laborers	15c
1 = Hydrogen plant.	15

Yard gang

3 Laborers, hauling etc	15
1 Reg Carpenter	25c

guar gum –

Average rate.

$217. per day

Burn June 24th

16145 lbs Coal 24 hours 7.2 tons.

Oxalic acid used per lb of
Fe Mix. 5.25 c lb
H_2SO_4 1.85G. 100 lbs \$1.20.

Ulster now – 1.75 c lb. we pay frt
Ni – 25
NaOH. 2.65 per 100 lbs 98%
KOH-Electro 7c lb – 98% –
Mercury 66 c lb. includes
bottles, [illegible] about returning or
getting credit –

Grafite. $7\frac{1}{2}$ c lb. 85 to 88%
HCl – 1.290 1.6 c lb.
HNO_3 – 1.400 SG 3.75 c lb
BaOH – S get bill of last from Europe
$Na_2CO_3 - 10H_2O$. 3/4 c lb Recryst.
H_2O_2 10c lb – 1/2 strength Merchand
filter bags – Linen $62\frac{1}{2}$c yard
Cost securing
Cost Water 12 S c 1000 gal –

fitting Canvas 54c yard
Ammonia 8½ lb.
Oil
Lamps
Packing.
Chromic acid,

Nickel Hydroxide
Items making up Costs

~~[illegible]~~
Cost of CP Nickel Sulfate Solution

107 lbs Nickel 25c	26	75
120 lbs Brimstone Vitriol 1.20	1	44
Nitric A. 7 lbs $6\frac{1}{2}$c lb		45
Carb Soda - 25 lbs 3/4c lb		20
Labor 10 hours 17 1/2c h	1	75
" 4 " 20c h - (½ of foreman)		80
	31	39

Yield - 975 Liters
Cost per Liter 3.22c

Nickel Hydroxide

1114 Liters Ni Solution at 3.22	35	87
300 lbs Caustic Soda $2\frac{65}{100}$	7	95
2000 gal distil H_2O 3/10c gal	6.	00
Labor 20 hours $17\frac{1}{2}$c	3	50

Formans o/o	1 35
Cost Linen filters	1 60
	56 27

Yield 200 lbs
dry hydroxide —
28.14 Cents per pound.

Nickel mix in cans —

150 lbs Ni hydrox	42 21
42.3 lbs grafite.	7 19
5 1/2 liter KOH. 4 6/10 lbs	25
Labor 10 hours at 20c	2 00
o/o of foreman — 40c	40
	52 05

Yield 195.13 lbs —
27 Cents lb —
In Cans with little help from a laborer —

~~Iron mix = Black~~
~~Doped in Oan~~

~~120~~
~~200~~ 80 lbs per day
of Fe_2O_3 —

Oxalic a 130 lbs	6 82
280 lbs $FeSO_4$ at .3/10 c	84
2000 gals distilled H_2O	6 00
Labor roasting 5 hours 15c	75
gas for roasting 2000. cf 70c	1 40
	15 81

80 lbs 19.8 c lb —

To get this into Black mix

120 lbs Fe_2O_3 at 19.8 lb	23 76
240 H_2SO_4 for Iron	2 88
20 lbs Dope 66 @ $HgCl$	13 20
200 lbs Metal Fe 1 75	3 50
Labor 1 man 5 h at 15	75
" 1 " 5 "	75
1 5 " "	75

E

1/0 Foreman	1 hour	40c		40
1/0 "	5 "	25	1,	25
Coal for purifying H, 500 lbs at 3.50 ton				90
Coal on Iron reducing furnace				
1600 lbs 800 per ruler of 75 lbs			2	75
Labor mixing. Canning				50

Yield 124 lbs black lamp canned

41.4 c lb =

Treating Rubbers for Cells

Cast nickel welding -

Reefs

Can strips

parts.

Grafite Coats.

KOH Electrolyte

[illegible] assembling [illegible] plate cell
" 27 "
45

Labor Soldering & inserting
Stubs in Top plate [illegible] p cell

" 27

" 45.

[illegible] Cost Canning without
[illegible]

Test room costs daily

Efficiency Boiler test

Power costs Labor
" Coal
" Oil
" Water
" Coal (hand)

Naptha distilling
table
Naptha, 5

[illegible] metal used on
[illegible] all sides [illegible] plate

" [illegible]
" [illegible]

[illegible] Nickel plating
[illegible]

" .77
" 1/5

Things necessary to increase Capacity Glenk & S Lake factories
1, 200 18 platters daily —

Press dept 2

2 Hydraulic press 12" Ram — ordered
1 Intensifier "

Perforating dept 3.

2 perforating Machines Ordered Ott mkg
~~1 3 spindle drill — On hand~~
2 2nd hand Screw Mac 1 on hand ([illegible])
3 acme SM ordered
2 5/8 Auto Screw M space Washers — ?
~~1 Oil Separator On hand~~
~~1 Soda Kettle "~~
~~2 15/16 Shafting "~~
~~1 20 HP Motor, its 40 HP on hand~~

Briquetting dept
1 Nickel filling Mac

Assembling
~~1 Boiling Tank — On hand~~

6 Strip plating Mac
2 now being made at lab —
going ordered 4 more —

Boiler Room
Boiler from mine —

Rubber parts Cost.

E 18 —

Pole washer	1 3/4 Cents	– 3.5 C
" Insulator	1.4 Cents	2.8
Stuffing box gasket.	.85 Cent	1.7 Cent
Gland Cap	3 ½ C	7 Cents
Lid gasket	~~[illegible]~~ .85 C	~~[illegible]~~
Side insulator	7 C	14
Separator Top gasket	.0017	—
Pocket Insulator, Separator	1 1/8 C	9.5 Cents
Bottom Insulator	9 C	
Plate insulator	11 C	22
Block Insulator	2 6/10 C	
Cell Separator right	3.65/100	7.3
left	3 65/100	7.3
middle	4 ½ C	9 Cents.

Σ Total 1.8285

Total E 27 2.5992

Weight Completion of

E-18- Σ 12.5 to 12.75

E 27 — 17.25 to 17.5

E 45 — 29.75

[illegible] 18F

[illegible] side seam	.35	per 100
[illegible] square sheet	4½ c	"
[illegible]	6	"
[illegible] end	4½	"
[illegible]	4 1/4 cents	"
[illegible]	6	"
A, Wire	7½	"
B Plate		"
C Unwire	7½	"
Trim	4 1/4	"
Corrugate side	31	"
" end	31	"
Mark patent	6	"
Notch end short	8	"
" " long	8	"
Edge	11½	
Bend 1st Operation	11½	
2 "	11½	
3 "	11½	
Side seam	1.00	
#402 Can side	2.00	

203 Can bottom	2 cents	100
Draw	4	
Trim	4	
A wire	3¼	
C Unwire	3 1/4	

Cover group Cut

[illegible] – assemble 15 cents 100

Close in 15

A wire $2\frac{1}{2}$

Unwire $2\frac{1}{2}$

Attach [illegible] band 15

[illegible] band 18 9

[illegible] band 9

[illegible] Bellows.

Cut blank	2 cents
1st Draw	4
2nd "	4
Trim	4
Size	4
Pierce	4
A wire	$2\frac{1}{2}$
Unwire	$2\frac{1}{2}$
Draw Eylet	$5\frac{1}{4}$
Bellmouth Eylet	$5\frac{1}{4}$
Mark plus	4

106 –

Stuffing box 107

A wire 3 cents 100

C unwire 3 1/4

~~[illegible]~~

Gland –

Coil Cut in rings Bend

4 A wire 4 B Plate 4 C unwire

Valve box

A wire 3 1/4 100

C unwire 3 1/4

flatten Valve seat 4 C

Seperator Valve set

Form

Burr

A wire 1 1/2

B unwire 1 1/2

Swedge 4 1/2

Seperator Top
Drill 2 small holes 25 per 100
Countersink 3c
A wire 3 1/4
C Unwire 3 1/4

Baffle
Blank 1 1/2
Punchholes 2 1/2
Form 2 1/2
A wire 2 1/2
C Unwire 2 1/2

Baffle spring

Screen
Shear
Blank 2 c
A wire 3 1/4
C Unwire 3 1/4

Screen spring

Coil Too

Cut to size (

a wire

C unwire

Filler Gandy

A wire $3\frac{1}{4}$

C unwire. $3\frac{1}{4}$

Lever band group

assemble 9c

Notch 8c 100

Hinge band

Blank $1\frac{1}{2}$

Ream

1st Draw $3\frac{1}{4}$

flatten $2\frac{1}{2}$

Pierce $5\frac{5}{8}$

2nd Draw $5\frac{5}{8}$

Trim $5\frac{5}{8}$

3rd Draw $5\frac{5}{8}$

Stop Notch $5\frac{5}{8}$

Ream holes 5
Countersunk
~~#~~ a wire 3 1/4
C Unwire 3 1/4

Lid lever
Blank 1 5/8 per 100
Pierce 2 1/2
1st bend 2 1/2
2nd " 4
Clip 1-5/8
Ream
Countersunk } 8
wire 3 1/4
Unwire 3 1/4

lever pins -
Cut to length
wire
unwire

Lid assemble 9
Close 3 1/4

Lid Cap		
Blank	1 1/4	100
Draw	3 1/2	
Wire	3 1/4	
Unwire	3 1/4	

Lid plate	
Blank	1.5/8
Pierce	4
Stamp	2 1/2
Ream Counter	5
wire	3 1/4
Unwire	3 1/4

Lid Bottom	
Cut & Draw	1 5/8
Reduce	5 5/8
Trim	1 5/8
1st flatten	4 1/4
2nd "	2 1/8
Wire	3 1/4
Unwire	3 1/4

Hinge Cutter
Wire 1 1/2
Unwire 1 1/2

Hinge Spring
Cut to length
Wire 1 1/2
Unwire 1 1/2

Nickel plate,
Stamp grid
Set in pockets 35 c 100
Roll 5
1st press 15
2nd " 15

Grid
Shear stock 2 3/4
Blank & pierce 6

Wire 3 1/4
Unwire 3 1/4

Nickel Rocket group
Filling inside cups
Assemble #141 + #142
Close
Remove
Inspect
Roll
Size
Inside Cups
Reel stock
Perforate
Flatten
Press into cups
A put in rack .10 load
B plate
C remove from rack .04 "
Anneal
Put in holder for f. mch. .12 1/2 "

Outside Cups.

Reel stock
Perforate
Flatten
Press into cups

A put in rack	.10	load
B plate		
C remove from rack	.04	"
Anneal		
Put in holder for f. mch.	.12½	100

Nickel Powder

Positive Pole Group

Assemble		
A wire	.03¼	"
B plate		
C unwire	.03¼	"
Re-thread		

Positive Pole

Mill head	.75	100
Drill		
Ream	.75	100
Burr		
Re-thread		
Grind taper		

Positive Connecting Rod

Forming & thread	.35	"
Thread one end	.15	"
File to guage	.35	"
" " "	.45	"
" " "	.55	"

Spacing Washers .375"

Form		
Countersink	.12	1000
Grind one side	.16	"
Face to size	.10	100
Grind	.16	1000
A. wire	.01½	100

B. plate		
C. unwire	.01½	100
Anneal		

<u>Spacing Washers .310"</u>

Form		
Countersink	.12	1000
Grind one side	.16	"
Face to size	.10	100
Grind	.16	1000
Wire	.01 ½	100
Plate		
Unwire	.01 ½	100
Anneal		

<u>Spacing Washers .128"</u>

Form		
Countersink	.12	1000
Grind one side	.16	"
Face to size	.10	100
Grind	.16	1000
Wire	.01 ½	100

[illegible]

Plate		
Wire	.01 ½	100
Anneal		
Spacing Washers .243"		
Form		
Countersink	.12	1000
Grind one side	.16	"
Face to side	.10	100
Grind	.16	1000
Wire	.01½	100
Plate		
Unwire	.01½	100
Anneal		
Spacing Washers .180"		
Form		
Countersink	.12	1000
Grind one side	.16	"
Face to side	.10	100
Grind	.16	1000
Wire	.01½	100
Plate		

Boot+Shoe stock

Rubber	12	lbs
Reclaimed R	25	"
Chalk	25	
Litharge	12	
Sulphur	1½	
Pitch		

Tire formula

Rubber	12	lbs
Reclaimed	25	
Chalk	25	
Litharge	4	
Sulphur	3	
Lime	½	
Zinc Ox	5	lbs

Reclaimed 13c [illegible]

Unwire	.01½	100
Anneal		

Spacing Washers .113"

Form		
Countersink	.12	1000
Grind one side	.16	"
Face to size	.10	100
Grind	.16	1000
Wire	.01½	100
Plate		
Unwire	.01½	100
Anneal		

Split Washer

Blank	.02½	100
Flatten	.01 7/8	"
Split	.01 7/8	"
Tumble		
Spring tempered		
A. wire	.01½	100
B. plate		
C. unwire	.01½	"

Clamp Nut

Blank	.05	1000
Flatten	.06½	"
Tumble		
Drill		
Tap	.10	100
Burr		
a. wire	.01 ½	100
B plate		
C unwire	.01½	100

Clamp Nut Insulator

Treat

Pole Nut

Form		
Tap		
Grind		
a wire	.01½	100
B plate		
C unwire	.01½	100

Negative Group

Assemble

Iron Plate Group

Stamp in grid		
Set in pockets	.40	100
Roll	.05	"
1st press	.15	"
2nd "	.15	"

Iron Pocket Group

Filling inside cups
Assemble #141 & 142
Close
Remove
Inspect
Roll
Size

Iron Powder

Negative Pole

Mill head	.75	100
(Drill		)
(Ream	.75	")
(Burr		)

Rethread
Grind

Negative Connecting Rod

Forming + thread	.35	100
Thread one end	.15	"
File to gauge	.35	"
" " "	.45	"
" " "	.55	"

Pocket Insulators
Treat.

Plate Insulators
Treat

Bottom Insulator
Treat

Side Insulator
Treat

Cell Connector Group

Assemble		
Solder		
Plate	.03	100
Swedge	.06	"
Bend	.09	"

Connecting Wire

Cut to length	.02	"
Straighten	.02	"
Cut thread	.13	"
Tin ends		

Connecting lugs

Pickle		
Tumble		
Rough ream	.85	100
Drill + Face	.85	"
Face	.10	"
Drill for Tap	.40	"
Tap	.08	"
Ream	.50	"

A. wire .02½ 100
B plate
C unwire .02½ "
Anneal

Terminal Group
Assemble
Solder
Wind with tape

Terminal Wire
Cut to length
Clean each end
Tin

Terminal Lugs
Pickle
Tumble
Drill & Face .85 100
Face .10 "
Rough ream .85 "
Drill .40 "

Ream	.50	100
Wire	.02½	"
Plate		
Unwire	.02½	"
Anneal		

Separator Top Gasket

Treat

Negative Pole Group

Assemble	.03¼	100
Plate	.03¼	"
Re-direct		

all out

Net sale to date
orders on hand
Stock on hand Cells
Payroll & rate,
Water, Oil-Coal,
Supplies all kinds,
Casting. gas.
Cyanide
Nickel anodes
Incandest Lamps
Autos, repairs
Packing - Crating
Cost Trays -

Rubber Machinery

Wm R Thorp
Trenton

16 Dia 27 face Washer + Cracker $675 =
HP. 20-

Grinder Mixer + warmer is all the same machine, steam heated Cylinder

16X42 — $650,

Hydraulic press —
15X15 — 8" dia Ram
2000 lbs per sq inch on that amount —

Vulcanizer. 4 ft dia - 8 ft long
~~Cars~~ abt 300 to 400 ~~dollars~~
without Cars $95 Each car
2 cars

Callander, 2 ft length
3 Rolls 14"00 Chilled
14" dia

157. 2.68
139 11 98
228 211 00
98
622 225.6
225
847

12) 1393 (116
12
19
12
73

2703
36
8109

300) 1393
464

5) 1393
278

6) 1393
232

8) 1393
174

11) 1393 (12

1	13.93
2	6 96
3	4 64
4	3 45
5	2 78
6	2.32
7	1 99
8	1 74
9	1 55
10	1 39
11	1 27
12	1 16

44
4
44
6
528

$17\frac{5}{0}$
1050 00

600.

14^{00}_{08}

12^{00}_{3}

2

14^{00}_{25}

3684
528
360
350

4922

600) 4922 (8,20
4800
122

8.20
1.50
50

Expmts on Lansden Towner

Boards laid lengthwise & levelled flat, fish scales - tire start

Motor 64 - 56 56 56

Motor just moved when reading taken

pumped tires hard

4 Read fish scales

34 35 35

Oiled axles & put chain back

had change distance bars

used cylinder oil

38 42 44

Slackened chain - 42 46 50 49 48

Ran out in yard & back

44 46

Running Watching ave

Level - good road

1st Notch Ampere 33-37-40-42

2nd notch 47-52-52-

Coming back 33-29-27

3rd notch ~~...~~ - 48-53.

Coming back 37-33-30- } 41

4th notch 60-64-68

Coming back 54-47-48

Coming up ~~...~~ Alden st hill —

3rd notch 66-72-74-75

4th notch - 86 88 92-92

4th speed was faster than Runabouts - 3rd speed very much slower -

If 21000 bbls week all ground
Cost 44.3 but require 5c
for Extra Labor & Coal wear etc
49.3 per bbl —

Coal Kilns 3000 bbls 235 | 235
" power 73 lbs 265 | 194
| 430
397 men, 196 Pts., | 777

Taxes, Ins. Fire Ins Telephone, office supplies [illegible]	37	
Explosives 20	18	
Drill rods	10	
Oil system	15	
Chute wear	10	
Wear belts	6	
Lining Kilns	20	
Repairs, Elev & Sep	7	
Roll repairs	27	
Gypsum	72	
[illegible] supplies	60	
flights	3	
Screw Conv	5	
Wear roll plates	30	308
General Exp —	37	

$1552.

2200 Crushed at 55c
1210

$342. day
or
Leaves off 10000 per
month Tied up in clinker
30000 bbls clinker
stocked per month.

Invoices Phila ofs apl may june july	22 853
" Wks ofs june july	34 388
Mdse notes due July to Nov	55 739
Pay roll to July 20	16 000
Unfilled order 7/16 –	9 296
	138 276 –

of open accts – 30 000 prob can be put in notes, 55 000 of pending notes, can be extended by paying 3rd of extended –

$FeOH$. removes chromate
HgO. apparently removes Ferrid Cy
HgO dont remove Chromate
$MgOH$ removed Ferrid Cy
Lime OH " "
Millon partially " "
$BaCO_3$ " "
$MgOH$ dont remove Cr
Millon apparently removes Van
$BiOH$ dont remove Cr
Millon dont remove Cr
$BaCO_3$ dont remove Cr

12 Cells 24 hours per
HP - 24 hours,

400 cells 32 HP 24 hours
\# 18 dai 800 lbs 2½c lb for pow
2 cents for iron 4½
Labor 2c Total 6½

64
800 lbs 32 3200
1800 5000
144
432

432) 2743 cops (6
2592

Rafer

~~Spt~~

3½ ft hours 1 ft wide

2 V 140 amp
1600 ft strip 280 watts.

6 cells 24 hours ½ HP

84 ft.

24
35
120
72
840

12
48
1600

140
2
280

1600
12
3200
1600
7) 19200
2743

K Manganate is very sol in Alkali without change
Alkaline sol has great tendency to produce with certain oxides precips which settle rapidly & are constant in composition
The sol is also a powerful oxidizer & certain compounds are oxidized at ord temp whilst permang K requires heat & large excess, lastly the end of the reaction is sharply defined green color disappears & sol is colorless = to make add (2 mol) KOH in a crucible some H_2O added & finely ground permanganate K (2 mol) gradually added with constant stirring & heating after 2 hours

[illegible] [illegible] heat crucible cooled & whole placed in well stopped bottle to prevent access air & organic matter

Cobalt in KOH is plenty bad as it forms high & low oxides whereas Ni' doesn't & is insol

Tires etc. [illegible]
Alternator -
Oil -
Bumpers, Ropes, Chalks,
Shop Supplies [illegible]
Labor
Repairs
[illegible]

3 1/8 % 1 76 2 | 2300 / 1150

1150
690
2555
235

4

3000

75000
75

(25585)

2240

2200 | 324

1976
3800

2600
35000
28000
9

23600

6004

746 | 137
68
50
114

110

9

3

165

125
42
250
500
5250

5250
35
26250
15750
183750

746)

5250
50
262500
60
746) 157500
7462
8290

1837
60
110220
746
3560
(14

746) 15750
1492
836
744
84

746
2.11

1505
746
759
(2

43
35
215
129
1505

756)

1505
60
90300
156
2
1475
147

(1

200

24
6
144
200
28800
28
210
2880000

2200
150) 3000 (20

57600
446) 6048
446
1588

135 lb.
50
6750

200) 2500 (12
200

67 50

28800
2
446) 57600 (13
446
1300

135
17
945
135
2295

14

23
50
115

24" lever moves 628
850 Rev motor
weight on End lever to
start wheels & axle
1 lb 7 oz

at full speed end lever goes
5338 ft minute. which at
1.44 lbs is 7686 lbs pull
this is less than 1/4 HP to
start.

64 lbs to move Lunsden on
floor -

7686 | 33000 (43
30744
2256

Mats, credit V. L.

Firestone Tire Co
N York
Broadway near 58 St

Rb. Kershaw 131 Rev –

26. 125
45

131.

1440

42 E 27

Lansden Tonneau

		amp
Motor only	1 notch	9
	2	9
	3	8.5
	4	13
Motor & jack	1st notch	13
	2	13
	3	14
	4	23
Motor, jack & wheels	1st	15
	2	15
	3	15
	4	23

45
35
35
35
157

62 | 434 | 7,2

72 | 100 | 14

128

233

281,500
1405

150,00

21
8
4
3
4
5
45

225
125
125
450
225
28125

281
45
1405
1124
12645

384 -

233

350

225 12
306
36

225

16

2

47 48
48
53
37
33
30
6) 248
41.3

41 amp

[ITEM FOUND IN BOOK]

EDISON STORAGE BATTERY CO. GLEN RIDGE, N.J.

LABOR AND MATERIAL

WEEK ENDING JULY 13,1904

	Labor	Material	
Executive,Engineering,&c.	$157.08	$ 2.68	
Office	139.22	11.98	
Selling Dept.	84.62	26.00	
Manufacturing Dept.	1393.19	883.01	
Testing Dept.	78.93	3.63	
Packing,Shipping & Store room	71.22		
Repairs & General Maintenance	228.72	211.42	
General shop gang	98.01		
Power	60.33	122.95 18.92	Coal
Freight & trucking	13.90	59.21	DLW
Supplies for tool room		4.20	
New Construction	18.15	64.36	
New Machinery & Tools	360.13	656.51	
Fire protection		12.60	
Interest & Discount		1.88	
Total	$2703.50	$2079.35	

$4782.85

1098.85
3684.0?

360
656
82
1098

614)3684(6
3684

[ITEM FOUND IN BOOK]

[illegible] changed in the special electrolyte [illegible] with good changed [illegible] KOH without [illegible] change [illegible] fully changed [illegible]

	[illegible]	[illegible] #1	[illegible]	[illegible]	2nd .50 [illegible]	3rd $3\frac{3}{4}$ [illegible] new KOH
2K	2166 2165 2164					
K_2WO_4 $\frac{1}{10}$	2155	3108	1132	[illegible]33	1057	853
" 1	2154	3107	1005	[illegible]	1104	807
[illegible]O_3 $\frac{1}{10}$	2153	3106	1077	[illegible]7	991	857
" 1	2152	3105	1040	[illegible]	1041	857
K_4FCy_6 $\frac{1}{10}$	2151	3104	117	[illegible]	810	577
" 1	2150	3103	183	[illegible]	187	220
K_2TiO_3 $\frac{1}{10}$	2149	3102	1097	[illegible]	1038	857
" 1	2148	3024	1083	[illegible]	1032	870
K_2MnO_4 $\frac{1}{10}$	2147	2023	933	[illegible]	980	860
" 1	2146	3020	903	[illegible]2	1010	503
K Cy O 1	2166	3119	717	226	1183	770
[illegible]O_2 $\frac{1}{10}$	2165	3118	1126	[illegible]	1043	873
" 1	2164	3117	997	[illegible]	987	863
KI $\frac{1}{10}$	2163	3116	1172	[illegible]	1052	867
" 1	2162	3115	1247	[illegible]	1147	857
NH_4VO_3 $\frac{1}{10}$	2161	3114	87	[illegible]	98	93
" 1	2160	3113	33	[illegible]	56	55
K_2CrO_4 $\frac{1}{10}$	2159	3112	520	[illegible]	1043	572
" 1	2158	3111	280	[illegible]	183	63
K_2[illegible]O_4 $\frac{1}{10}$	2157	3110	840	[illegible]	1177	726
" 1	2156	3109	113	[illegible]	1006	772

[illegible]

[ITEM FOUND IN BOOK]

Ni's charged in the special electrolyte & [illegible] with good charge [illegible] in fresh 1% KOH without further change. They [illegible] all be found [illegible] the [illegible] the [illegible] as sampling

Ed	cell #	To .5V	[illegible]V.	2nd R. 24 hr chg / charge Rest	3rd 3 3/4 hour chg
2155	3108	1038	[illegible]63	1326	883
2154	3107	1108	1001	1246	905
2153	3106	1133	992	1340	925
2152	3105	1153	833	1303	860
2151	3104	1450	336	1353	900
2150	3103	1080	466	1443	883
2149	3102	1130	1083	1312	933
2148	3024	1111	843	1206	907
2147	3023	1353	1116	1250	867
2146	3020	940	503	1263	933
2166	3119	1150	1013	1207	900
2165	3118	1110	787	1320	933
2164	3117	1133	760	1243	900
2163	3116	1047	[illegible]17	1153	900
2162	3115	473	[illegible]13	533	450
2161	3114	1157	347	1327	933
2160	3113	53	17	1387	860
2159	3112	1133	[illegible]23	1137	900
2158	3111	1220	30	1273	900
2157	3110	1217	[illegible]0	1367	860
2156	3109	1317	[illegible]83	1293	930

Reg generally gives 1200 to .50

Notebook, PN-05-02-07

This pocket notebook was used by Edison during the period November 1904-February 1905 for notes on experimental work and for lists of tasks to be performed. Many of the proposed experiments pertain to the chemical composition, construction, and charge and discharge conditions of storage batteries. Included are entries describing groups of test cells, some with nickel flake elements in their electrodes. There is also a note by Edison reminding himself to see Frank L. Dyer about filing a patent application on the nickel flake. Among the employees mentioned in relation to individual experiments are Ralph Arbogast, Jonas W. Aylsworth, and Walter E. Holland. The pages are unnumbered. Approximately 50 pages have been used.

PN-05-02-07

1000 000 -

$$3600 \overline{)\,100\,000} - (27$$
$$\underline{72\,00}$$
$$28\,000$$

$$3600$$
$$\underline{\quad 20}$$
$$72\,000$$

Precip with 90% Ni
10% of following
Wash well ex and KOH
then fuse in Solid KOH
to dehydrate
Bi Mn Fe Mg Cd Zn
Co Cu Ag Pb + in fact all
the metals — 644 —

also with 90% nitrate
Ni add 10% of nitrate
of other metals bring
up + oxidize to Ni_2O_3
+ Reduce with various
reducers a try graph
644 —

Soak Dehydrated
NiOH both by fused
KOH + by nitrate sparked
+ reduced with
all the metals a sponge
while in suspension
to get an OH free the
anhydrous Ni

Chloride Ni disolved
in Ether, or non water solvent
& then heated with metallic
Sodium - to get NiO -

Perhaps $Ni(OH)_2$
formed in acid
Sol will be different
~~color~~ from those precip
by KOH -

Perhaps base of
Mauvine or other
organic base
precip $Ni(OH)_2$ -

Distill Carnauba
& Lanolin ~~with~~
Chl Zinc mixed
get high BP
Hydrocarbon

get some Sludge A
Bulls & dif
asphalts, Texas
Canada/Lima
& California petroleum
distilled —

~~Jumpers use No 4~~
~~also large hole~~
~~terminals [illegible]~~

What is voltage between
2 nickel strips alone
in KOH, charging

also get Ni Cup &
Ni strip also Fe Cup &
Ni strip

~~Dalley make enough~~
~~gland ball valves all~~
~~over centers~~
~~John ask Cabinet Gore~~
~~separator tops —~~
~~put in all centers~~
~~& get results~~

~~Ditto silvered~~ Connectors
& No 4 jumpers

Try ~~Reversing an [illegible]~~

~~Try an original good cell that by long running has gone bad again by adding H_2O_2 to old Solution & see if it doesnt Come up~~

Chg voltage between 2 plain Ni strips 2.82 about chgdg on rate
300 Rate

Chg Voltage bet Ni pocket and plain Ni strip 1.76 at 350 rate. Ni pocket fully charged –
Chg Voltage bet Iron pocket & plain Ni strip 180. at 350 rate, Fe fully Charged.

Ni pocket Ni strip .42 Volt chg
150 Rate = 50 rate 74

Fe pocket Ni strip .108 Volt chg
150 rate at 50 rate 66

Above cell was dischgd to .50. & then put on at 150 rate,

2 Ni strips, at 150 rate 230 Volt chg
50 219
70 220

1 Model H 18
2 " H 27
3 " H 36
4 " H 45
5 ~~new gas vent non stop~~
6 Supply varnish – gallon cans
7 ~~4 Plating machines~~
8 ~~B & W Boiler house~~
9 ~~Automobile shed~~
10 ~~Skylights new assembling room~~
11 ~~Seam welding machine~~
12 Supply Electric water fillers
13 Block insulators E 18
14 " " E 27
15 " " E 45
17 " " H 18
18 " " H 27
19 " " H 36
20 " " H 45
21 ~~Stop bulging cans outward~~
22 ~~Test new Pittsburgh stock~~
23 ~~Weld Cement cable~~
24 ~~Shims for Cement rolls~~
25 Can Tools H cells
26 Supply lead glass Tools
27 filtering KOH oiled Magnetite

28 Overfoaming cells
29 Fix up Auto batteries
30 ~~New Cement cable single splice~~
31 Insert wires motor flexibles
32 " " Gandy belts
33 ~~Get sheet rubber from Amer HR Co~~
34 Herter charge Pan Am To Electric
35 How about anode furnace
36 ~~" test Silver & Studebaker battery~~
37 ~~Get Johns welding M. ready~~
38 ~~Ask Fleis about Adams new battery~~
39 ~~" Ross about " & Sloanes.~~
40 ~~Hurry up Iron reduction pots~~
41 ~~" Annealing "~~
42 ~~When arrives set up new distilling app~~
43 Herter Belt Con design replace Elev 2
44 " 3rd fine grinder etc
45 " Increase coal grinding
46 Randolph send check Jutulong
47 Drawings H Trays for notify Trade
48 ~~Changing present E Trays~~
49 ~~New glass side Ni filler~~
50 " Ni filling machine
51 " Ni Crimp die
52 ~~All mixers tested & cell run before use~~
53 ~~Non vibration Ni plating dynamos~~

54 Barnes varnish trays
55 Buttons for holding Top Cells
56 Jig drill for buttons,
~~57 15 & 27 for Lansden~~
~~58 Old Baker got in order~~
~~59 Mud guards Lansden~~
60 Fix switches at stable
61 weld strips for plating
62 " pieces in top can - Ireholt -
~~63 Ireholds new welder~~
64 " design side seam weld
~~65 Skylights assembling room.~~
66 Cost producing Ni Fe etc Silver {
67 Rafn Long strip plater -
68 Station cell 3 high 3 wide
69 Fix charging at Barn
70 New Table for Ni filler -
71 Ralph Test cell Rubber chips
72 [illegible] man charge test cell [illegible]
~~73 [illegible]~~
74 Complete outfit Nickel filling
75 Change Cement mandrels -
~~76 [illegible]~~
77 Make nickel flake -
~~78 [illegible] put on [illegible]~~
79 = See abt size Upright Eng Cement [illegible]
80 = glass balls break -

Nov 4th –

1 = Make clip to hold single particle NiOH watch glass + KOH, to watch change to NiO_2 which changing under Micro OK tried [illegible] Expts.

Cut out some pocket, just strip on – from Gibbs. Boil 2 in 20%, 2 in 5%, 2nd 3% 2 in 1% in water changing KOH occasionally boil for 3 hours actual boiling & 2 do nothing with, Charge 15 hours 100 & discharge –

Mem, Dr Bradshaws battery Was ruined Couldnt get back Crossed badly possibly Stuff came off Neg then to Can & thence to Ni –
Burnt holes in Corners
Rubber never treated

Also more Gibbs pockets tit on

Make Cup 6% B, NiOH
no graphite 15 hours.

Little Reg Ni
Change 15 des days
+ Keep this up for several
days. Use 10 of them
all in one jar,

Make up Gibbs coll 6 ad plate
put in Kettle + Keep 175°
for 48 hours, 20% KOH,
Change Solution every 12 hours

Finger rings 8×2 flake
Malone, 150 Cor -
Soak in strong hypo - before
running

Feby 7 1905

Try reversing old pocket 24 hours then Bromine water to Eat iron out & not touch nickel or dont think Br will hurt metallic Ni if stopped when Fe all gone

Could find this out by acting with Br on nickel & iron flake

Get drawings of Cleveland Carbon mixer—

Get some pure glucose, also Grape sugar, honey & Caramel—

Make some Ni flake Coated Silver on both sides—

Ralph. F2 tests
6 8 10 12 & 15 % Hg—

Reverse exp iron & seal
out all exp By Personne
see how it runs —

See whether Can get out
Iron using no Hg
Except $HgCl_2$ &
Ni strip, clip Fe thin
take out & watch —

Chloride Iron.
pass H over & Volatilize
as HCl, absorb in Water —
tell Ralph —

Oxychloride Ni
think NiCl dissolves
lot of Hydrate:
This would after
drying — swell in pocket

Could regulate the amount
& swell to get proper
porosity —

Chloride Ni, Volatilize
— sponge like take
Mosaic gold — Cannot
be reduced by H. to
get flake —

Prep NiOH leave $NaSO_4$ &
excess NaOH in, boiled —
then semi dry but still plastic
then paste in Cups & let
dry then press & Corrugate
then wash hot water
till SO_4 free. Then Cakes
no graf —
also powder coat the flake
Nickel — press & wash
press & recorrugate —

Antimonide Ni thin plates
press 2 at Ni / 1 at Sb -
with 316 a. com. -

6% Bi pp with Ni -
nice powder washed
dried powdered - 8 & 2
flake Ni - Weighing
2 Cups [illegible] one grm
175 Grams - .0003 flake

ditto 9% -

Messaba ore treated
to purify then ~~H~~
Red by H + use Hg -

See J Gubkin
Annal Phys Chem [2]
32 - p 114 Method

Making films

Extract C Soc Jnl 1888
p 101 says Cement
by passing [illegible] surface of
a [illegible] [illegible] Paper
or gas [illegible] it gives
films - Ag + Pt films -
Try Ni - Wash [illegible] -

Basic Mercuric Salicylate
Soln KOH without change
its pp by acids including CO_2

Lajoux J Pharm Chim 1903
VII 17 - 412 418

Ni Reduced by H
then thin cap. then KOH
weaker [illegible] or form by
current,

fingerprint - nickel [illegible].
Ni flakes 0002
0003
0004
0005

Oxide Ni in Cup pressed & whole Reduced by H,
then Ni(OH)2 got in by Soaking

---

flake Ni [illegible] - 8 & 2
[illegible] minimum [illegible]
2 1/2 g 2 1 3/4 1 1/2
1 1/4 grams. Can dilute with water to mix
Try both ways -

Cup in grid with powdered K Sulfate proper weight powdered. then Cramp & Boring, then displace out. Cut hole [illegible] at 2nd force in the OH [illegible] & close hole

---

Cup with powdered Dehydrated Sulphate Ni ~~[illegible]~~ Compacted then suspend in NH gas - ditto [illegible] in KOH, also Alcohol with KOH, if swell [illegible] [illegible] to Sulfate. Sulfate K etc

---

New Idea -

Parchment Cup electrode in Centre KOH, & Ferricy K - Fe. Concentration of Ferricy[illegible] inside parchment act depolarizer -

Possibly KOH saturated Ferro & parchment Cup solid Ferri.

Nickel flake Ni [illegible]
dust dry powder. Electrolyte
plumbago make slippery

Molasses flake Ni -
Nimine 10 dips
after final corrugated -

Plain NiOH. 175 grm
thru 150 mesh -
10 dips nimine -
ditto Dip - through
200 mesh - 10 dips
Nimine -

flake graf loose
with Sulphate K
1 1/2 grams - Corrug
then dissolve out
then dip 20 times Nimine

Make [illegible] paste
possible NiOH + [illegible]
paste into Cups [illegible]
Corrugate -

PP Sul Ni [illegible] KOH, [illegible]
then dry [illegible] -
powder [illegible] in Cups
Soak out K_2SO_4

ditto Molasses & flake Ni -

Oxalate Ni - 2 grm
boil in KOH, then dry
& Recorrugate -

Phos Arsenate Borate
~~Chloride~~

Charged Ni Red. by
H – KCy in KOH
see if get action –

Ni amalgam squeezed
out by pressure – see if
get action –

Try Group Bromide
K in KOH –

Group grids soaked
very strong KBr for
24 hours then put
in KOH & chgd immediately

Charge a group
& discharge in 33%
till it shows 65%
@ 700 – after discharge
~~change & [illegible]~~

Leave KOH in ~~dry~~
~~soaking till group~~
~~hot out~~, dry in dry
take out powder &
put in new Cups
Carry Reg – Run in
21% may be Ni_2O_3
Combing KOH Electrical
This should remove & swell &
give good porosity –

Also Oxalate Ni also
Carb Ni in a light
20 p.c.c. Carb – make 1 gram
Cups then reduce by H
in Cups & then fill pores
by alternately soaking
$NiSO_4$ – KOH or Ninfuse.

Also powdered Carb Ni
Red by H, at then put
in Cups & heat to
fill pores – 33% –

Will Carb Ni powder be decompd by Dry Ammonia — hot,

~~Prep. Ni from Sulfate~~

Set up in Precision room Jar & strips to make NiOH by alternating Current like that Ni [illegible] patent & test, see if Can find the battery he gave me — get copy his patents

Suppose Carb Ni is acted on by Ba Hydrate will it go [illegible] suppose Ba very dilute,

Try & work up Electro method making NiO_2 that [illegible] & [illegible] [illegible] made at once Must be slightly alkaline,

See if its possible to make flake sulfide Ni by acting on Ni flake by H_2S dry & hot, it may be that there is too great a drop but NiO_2 & crystal to get secondary action & therefore wants high Resistance flake —

Possibly Ni film could be partly changed to a Nitride they all Conduct E. —

Examine those nat on Endurance of Cups plated Cd & Cu &c — aq —

Write Jeff White get .005 strip [illegible] width Magnesium also data price Etc

is Ferro & Ferrid Cy of
Mg - Bi, decomposed
Ca by KOH if not
could be used as battery

Ferri of any Organic -

Put highly polished
Ni strips in KOH
100cc containing 5 grms
Aluminum -
ditto 3 grms KI
Note what current
does to surface -

As Vanadium kills Fe
by depositing possibly
Cups or Ni flake
could be deposited on
by Va which is a
Conductor (ie) the Mon
& Di oxides conductors
the metal dont deposit

Try polished Ni strips
& Vd solutions see
result,

Ni plate rulled 100 threads
both ways for making flake

~~+ [illegible]~~ so flake will
not be flat -

Investigate a high Cap
33% chlorides Ni
without soaking much
KOH out to see
if still lumpy dont
dry too much, if any

a group chg in 21
dis in 33 / [illegible] —

another chg + dis
twice in 21 [illegible] dis 33
once —

be sure make a
group with [illegible]
Solid + with + without
grafite —

Chg + dis then chg
in 21 a group
+ then chg [illegible]
KOH in + [illegible]
+ put in new Cups

ditto get all KOH
out —
ditto [illegible] KOH in
but do [illegible] dischg [illegible]

ditto wash out in alcohol

ditto chg + dis 33 —
wash out in alcohol +
put new cups —

ditto chg dis + chg 33
wash out alcohol —

Chg + dis 21 wash out
all KOH by alcohol +
rerun without [illegible]
in new Cups —

ditto chg dis + chg

ditto 33% Chg + dis

ditto 33% Ch dis + C

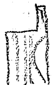
ditto 6% B, in [illegible]OH
Chg + dis, [illegible] wash alco
+ put new cups
ditto chg dis + ch + al
new cups —

Boil in KOH 5% old
26 cell cups / see if get
radicals out — also
soak alcohol warm dis
out KOH, remove mix
very careful - weigh +
put in new cups —

Save cup + put new ones
in old cups —

Chg gr'n 21 wait 24 hours
discharge then charge
right away + wait
after each chg 24 hours
this to allow KOH
soak in —

Run a Curve on
Markolaff Auto
Hall do it
Compare with ours



Make another
6 gram NiOH.
to get liquid Electricity
also one with 10 grams
Hodges spcl cups.

Make flake Ni Malcom
6 grams Cake group —
get liquid Elec
Hodges spcl cups

Malcolm 2 gram Ni flake —
SP 100 Cor 150 then soak —

group 2 Cups on grid
Rep. give to Warren
to chg 33% for
Cold Wks —

Acetate Ni dissolved in
Oleine acid, then
Chlorine to peroxidize Ni
or then KOH + then perox
to get nonhydrated Ni_2O_3

Only NiCl in glacial
acetic a + chlorinate

Make group [illegible]
green [illegible] 20 mesh
5 gram [illegible]
see if get greater output
than with 3 —

See Holland about
Endurance of [illegible] really
got the chg + [illegible] off
if he [illegible] in inst
to see if [illegible] OK —

Stearate Nickel
Saponified by Hypo
or Chlorinated —

Some green $NiOH$ by
precip Sulphate so there
is always 33% Excess
of KOH when fully pp —
put Sulfate in 40% in
small stream when it
gets to 33 free KOH
add more KOH + go on

Try then group green
no graf also one
with graf —

3 gm green chg 7 1/2
hours only takes
200 m a h out then
Charge again 7 1/2 hour
take out 200 then
on 3rd chg take ~~all~~ out
to 75 + run Reg

flake Ni plated
both sides Copper
also silver so
drop EMF [illegible]

plate Thorium
not attacked KOH,
Can use Crude
mix from Monazite.

Ralph dont fail
make Enough Cobalt
Red by H for 4
groups —
With & without Hg as
[illegible] — Mixed
grafite for Ni —

Just the thing, Copper
heavy plated with
Cobalt [illegible] —
full EMF OK —

If possible make a group
with [illegible] Magnesium [illegible]
[illegible] Reg Copper both
top & bottom, 1 plain copper
also Reg mix —

The very [illegible] NiOH
got when [illegible] with
NaCitrate & KOH,
This should be porous
when dried —

Can Nickel be
deposited from
Alkaline Solution
with Citrate
possibly in powder

The greater the Nickel surface outside the cups the less will be the gas internally when overcharg & less the swell –

Benzol & Rosin to stick flake Ni on

Alcohol & shellac

Benzol & Coal tar pitch followed

gutta & Benzol followed.

Run Reg group with large Ni Surface outside Cup but Connected to it so internal gasing be diminished –

Make a ~~reg~~ rolled wet with ~~Ni~~

Ralph reduce some Ni Low temp from most bulk Ni Compound that holds its shape say Carb.

Try 7 & 3 flake Ni wet Sol KOH, rolled –

Finger mix 2 grms Malaxxx flake Ni through 80 to 100 mesh –

ditto 80 120 mesh –

It is probable that Carb Ni acted on by Hypo the OH taking place of Carbonate will still produce pieces from Crumbling & gives porosity OK – possibly Oxalate & other salts which can be Oxidized out by Hypo – should be no free alkali in Hypo.

Carb Ni in grids & then treat Hypo

Over

Drum - assay Covers
from our Drill at
Stewartsville
improvement -
Those near present
grinding -

Set up 2 thin
sheets .003 magnesium
in 21% of pan
Continuously
see if it is ok -

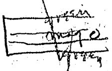
Magnesium tape
smooth & Roll
but take very thin

Burnish Ni Red by
H - to flake it also
thro rolls - vertical &
with differential
movement. Can form
a Ni salt, pure 200
mesh, grains all
same size, Red by
H & burnish flat
or differential rolling

Plate Cop through
then plate with
Ni both sides -
.0003 Cop .00005 Ni
each side -

Buy Magnesium powder
& Burnside or others
differential cells –

Reg Cup green
No graf – 1st layer
green – 1/3rd of bulk
then layer ~~[illegible]~~ Mag Oxy
~~[illegible]~~ 1/3 then 1/3
green



MgO absorbs
KOH & gives it out
2 grms green

See Dyer – file flake
Ni patent, tell him
get Jungner plating
Graphite – also file
graf split &
Rolling Ol –

Write Bergmann
that drawn can
No objection if its
plated & welded
& tops can be elec W
but that it of
course makes weight

Have Ralph send
up the little
bottles containing
the balance of
the Bismuth NiOH —

See if Cuprde ox.
scales Conduct E

Can possibly Sulfide
the Ni by using
Yellow Sulphide K
Electrolytically

Fe anode by Elec
distill in Hydrogen
not pyrophoric —

Mossan says the Monoxide
by reduction is green
when cold yellow when
hot it readily absorbs
ox at ord temps
if heated in air turns
black at 350, 400 °C
at 600 its reconverted
to monoxide

Says Monoxide forms Violet
Salt with NH4

Vol 40 C S jnl 77

To make Hydrate
from Na-Oxide by
passing air over it
which air is warm &

is freed from CO_2 & Saturated or heat with water V [illegible] before use dry [illegible]

Magnesium can be distilled in Vac deposited brilliant Crystals like Silicon

deposit Mg on the Aluminum paint powder & then eat away the Al by KOH. & ditto Zn

Try dif metals Cu Bi Fe in yellow sulphide [illegible] & then plate on ace of strips.

See if aluminum powder paint will reduce any Nickel Solution to replace Al by Ni.

Possibly Aluminum paint powder could be put on green Ni & then put in [illegible] & reduced by a Nickel Salt, or plated on & Al dissolved out & Recompressed

Reverse a KCy
(strong) of HgCy
graphite so as to
plate Ni on
graphite then
back out KCy
inspect new Fe in -

find some Ni Salt
that has uniform
Crystal pass 100
mesh Red by H,
& Roll out to
films —

Try Ammonia to
bring old 26 cell
back —

The particles of
Nickel for reducing
by H & rolling
should be about
.004 cube to
roll out 25 to 30/[illegible]
+ .0001 thick -

Plate Cop then Ni
then C & roll out
find something
Eat Copper

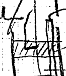
Carbzd tissue paper
high temp —
plate with Ni —
burn out in Reduction
furnace & then pass
H without moving it.

ditto charcoal
Carbzd high temp
plate with thick
bottom dish, then
burn & reduce by
H in situ —

Ditto Bran
Cotton,

possibly plate
Cop with Ni then
reverse 1/10 times then
plate until 20/1000
thick or less & then
roll would all
Seperate — Ni not sticking
to oxdzd Ni —
possibly exposing to air
do it — or putting Cylinder
in Hypo few seconds at
Each plating —

possibly a very slightly
Conducting organic
liquid over a plating
liquid & big Vallongs
grateful



Amyl Al
Alc,
Acetone —

Bugol
plating liquid

Moissan Annal C + Phys
[5] 21, 199 225

~~NiO or Ni(OH)2 etc~~
Hydrated or anhy Ni_2O_3
heated 190 C in H
Red to grey Magnetic Ox
at little high temp
Yellow green Mon Ox
this undergoes no
further change
at 200 C but at 230–240
is reduced to metallic
Ni Monox thus obtained
green when cold
yellow when hot
it readily absorbs
Ox at ord temp

Make groups in which
Ni Reg [illegible] is jarred
in Cup so it will pack
naturally closer

also group [illegible]
Hydrox — Tuning fork

This irregularity in
cells may be due
to some jarring mix
in (10) feed or filling
machine & [illegible]
better at times?

Possibly this jarring
action would be
a good thing on
Reg filler —

~~graph gassing in
water solution
graph carried in
water —~~

~~graph Mix made
wet putty like &
pasted on & ground~~

~~Ni flake depositing
on from the Carbonizing
with tungsten 660
Containing a Mercurous
Chemical or Bronze
Tissue paper Carbonized
& then burn out &
reduced by H —~~

~~Cylinder of glass hard
Steel - plate Ni
.0001 & use scraper
& scrape off in bath —~~

~~Ni mine soap on
a polished cylinder
or plate glass —
form film reduced by
H —~~

~~Powdered Spiegeleisen
& dope for TE —~~

~~Magnetite powder
& dope —~~

~~Split Mica by
Molecules or Rubbing
& Remove it —~~

Unca[illegible] make
it longer

Syrup of Nitrate Ni
gradually heat of
Varnish film on
glass probably
flake off -
Red by H -

Varnish of
acetate nickel
Dry + then
heat, ~~or decomp~~
by R by H

possibly glass
greased etc for
drying Varnish
~~etc~~ acetate etc

Squirt Resinate
Ni or Stearate
into Water -
decomp R by H

Squirt nickel
NiOH into
hot air or hot
oil - R by H
or mix chalk
+ dry

squirt Ca OH onto
Sulph Ni -
squirt putty like
Carb Ni. into
Oil - water
gradually heavy

Reduces Co Cl to
Metallic then
put laminae
into a Ni Solution
& reduce the Ni
to Metallic,

Acetate Hg (Mica)

Citrate Ni is jelly
dries to olive green
film —

Perhaps Numine
get quite thick
& stirred with
ground ~~[illegible]~~ mica
with hot air
that surface be
Coated without
Mica adhering
then red by H ~~[illegible]~~
heat & dep Mica
~~[illegible]~~

possibly a phono
Cylinder of
Compressed $Ni(OH)_2$
Could be made that
Conductance [illegible]
burning off [illegible]
+ humbug

Nickel makes beautiful
film — float on Hg
also greased glass
also paraffined glass

Dip a 20 mesh
screen in Ni NH_4
+ dry — make film
to be [illegible] by it

Make 66% Fe
33% Cu amalgam
~~[illegible]~~ distill the
pbly stop Fe crystallizing
+ be good — distill
in hydrogen —

Perhaps by using
Tin Lead Zinc Cd
Cu Ag + others
to form compound
amalgam it will
not crystallize +
Make a good
phono Record
Cylinder by
pressure

Sqmnt $Ni(OH)_2$ Mineral into alcohol to set it.

~~[illegible]~~ Cobalto cyanide of Nickel Sol in NH_4 when slowly Evap gives Bluish Crystalline Scales —

Good

Ammonia ferrous Orthophosphate.

fine Laminae when boiled with KOH decomposes leaving Ferroso-ferric Oxide at same time preserving the form of the original flake

Ferric Ethyl phosphate
Straw yellow films

Nickel Di Ethyl phosphate
Crystallizes in groups of Laminae

K & Na Salts Phthalic a
Cryst in Scales —
Meet its Salts Scaly
Try Ni

Naphthionates i.e. a
nearly all flakes

Ethyl Bromide Ni
gives [illegible] big
Scales [illegible]

Ethyl Iodide Ni
forms Scales

Nitrite Cu [illegible]

Palladium [illegible]
Nickel Nitrite –
Microscopic Tablets

Scales Xanthates –

Look over X ray Cryst!

Sulphocyanate Ni
Crystalline powder

Ammonia acids)
to many Salts lead
to make double
Salt Cryst in
Scales

Ammonia Cuprous
Sulphite, Scales

Ammonia Sulphite
Nickel Cryst pp

Amylsulphurous a
flake salts

Methylsulphurous a
ditto

Naphthyl sulphurous
Cu Salt scales –
others also –

Meta Naphthyl
Sulphurous a
flaky salts

Phenylsulphurous
Hydride or
Sulfophenylic ac,
Salts flaky

Amylsulphuric ac.
nearly all salts
soapy to touch
Co salts Laminae –
Cu Tables,
Ni salt Laminae –

Ammonio Hyposulfite
Ni Cryst powder

ammonio
Dithionate Ni
Tabular prisms

Tartrate green cryst
powder

Thianisoic ac
Cu Salt Laminae
nearly all salts
Laminae –

Metabenzylsulfonate Ni
Tables –

Adipic acid
Nickel's scales

Bismuth Ammon Chloride
25 to 30 grms per litre
Cold heat Sol plate

Bismuth —

to make per ox Electrolytically
use Alkaline Sol of
Ni & ~~Sodium Tartrate~~ Cream Tartar
Try Citrate —
dis hydrate OX Ni must
only little found
to be lessened —

Wernicke
Zeitschr f Chem
(2) VII 85
Poggend
CXLI 109

good
Nickel Cyanide forms
double Cyanides
with organic bases
all highly Crystaline

Make by double dec
CyN + Ba + sulphate of
base, (Ie) that way
for Co presumably
work with Ni]

The way the Co double salt made
was by moving Sulphate Co
this treated with
Barium Carb large excess
& Cyanhydric gas passed
until whole was converted
into Cobalticyanide of
Barium — This treated
with Quinine
Sulphate gave

The double salt very
slightly Sol. water
at [illegible] heat, on cooling
Crystalized out.

Leland use Cylinder
Zinc + paint with
Bergmann paint near
top & less surface
Local action & Res
just same —

possibly Mosaic
gold Tri sulphide
Tin by heating
with some Hg
Salt Exchange?
a form Sulfide
Ni - CuS +
other flakes good

Use of the flake Ni from
old pkt will swell up on
heating (if so there —
graphite acid)

Ferric from Oxalate -
~~if heated in open~~
~~magnetic oxide at~~
at 440 Ferrous oxide
obtained in 6 hours
Metallic Fe in 12 hours

at 350 magnetic iron
in 1 hour ferrous at
ten hours & metallic
36 hours —

Thus for Radiator Co
get Metallic iron
pyro but finer

Nickel large
surface let it scale
on Cap & skim
Continuously & put
in water or alcohol
dry —

Copper immersed in
yellow NH4 Sulphide
with considerable sulphur
added coated
crust of CuS, easily
separated from
the metal & easily
removed

get from Merck
Ni Br Ni F
scales —

Ni Carb in NH_2
forms crystals
by boiling it with
white crystals

by fusing persulphide
of Pot or Na
with diarsenide
of Ni leaves
crystalline scales

NA

good

Perhaps deposited Peroxide will scale off smooth plate

pass dry H S over Anhyd Chl Ni form HCl + leaves Sulphide Ni - ditto Br Ni - absorb H_2O -
Roast in Red Hydg -
pass H S over surface Nickel + Heat -

Stir Mica with Saturated Nitrate when dry add more until thick Enough -

try put NaCl Anhy in Conc Thiosulphate Na

Nickel Oxide dissolves in Sodium Pot

Mica may be fused in presence NaCl - crystalize [illegible] yellow Micaceous [illegible] - Na metal gives diff cryst

Sd. S.P. 1st part 1890 - CSJ

$2NiO.K_2O, As_2O_5$
$2NiO\ Na_2O\ As_2O_5$

Green Lammon [illegible]

Micanis Lammon

Lefevre Compt R
110 – 408 408 –

K+
Syrupy Stearate Ni. Melt
blow like soap bubble
then manipulate –

Called all the acids
in Lab to make Conc
Hot Solution Ni
& Crystalize –

to obtain Ni salts by
fusion use NiCl
and the alkaline
salt of the acid
with excess Chloride
Na –

Pyridine Combines with
Ni Salts to give dif.
Crystals –

Salts which act
as binders or by
themselves when
ignited to make
porous Ni Oxide
in Lumps –
Formic Ni. binder &
puff –
Monochloroacetic Ni
ditto
Sulfo Vinosum Ni
Large residue don't
puff but little

Chloro Crotonic
face dont melt.
Phthalic process
Tannic, binder —
Phenol Soap —

Black Iridium on
Silver film also platinum
plating Tales Dally
~~[illegible]~~ palladium films —
Rare metals plating
& make groups 7 & 3

plate iron with
Vanadium (ie) Mo Wo Cr
Make polished iron
surface a by Electro
form Vanadate iron
see if its Conductor
also Ni-Co & others

Make a 7 & 3
0002 - flake Ni
Run in Hydrogen
grease from fused
process Ni flake
Rolled Bag with
water — 7 & 3 —
also with Bag
KOH rolled —

Irehard grafite, rolled
H_2O also KOH,
Edison also make
finger test all
7 & 3 —

Put clamps on
the 2nd Ni flake
cell 3 weeks
gives of Condenser
capacity —

Warren under microscope
particle laying on
plated Ni / silver
copper & other
metal — also
carbon — graphite etc

Mix 8 & 2 of which
2 is 2000 mesh graphite
with mesh Ni — dry
then thru 20 mesh
3·2 cake

this is trace of particles
disseminated thru mix
has anything to do with it,

also, 8 & 2 latter
magnesia ignited —

Group Ni flake given
nitride — also sulphide
slightly ~~[illegible]~~

Make 2 nickels
Reg mix with nickel
cups coated with
anhydrous Ni O_2O_3
by painting with nitrate
& heating not too
high — also 2
with green —
Think anhy Ni_2O_3
is conductor

to ascertain this
make Magnesia
Cake with acetate
250 atmos heat &
Soak strong $NiNO_3$
& bring to black
Warm then to heat it

Try make
Metallic Co Hg sec
of Cake protect crystal

get several books
silver foil to
use as flake sticks
for a group —

Cont for 2 cells
Cups mould graphite,
molasses – press

What I make bal
flake Ni 7 & 3 group

Oxide Mg + Water chl Mg
as it evaporation combined
~~also~~

Chalk – Sr Ba Carbo
fused or acetate the base of
which forms easy – Pb formation
Cd – Sb
MgO – NH_4Cl —
Rubber, Borax. Manganese
~~Alumina~~

Oxide Zn – Mn, Sb.
Cd, ~~Co~~ Zn dust,

40 mesh green pure
Red in H, then plated in
Cup – Sizes – Hard –
Hypo by Current,

1st Run Melanoma flake
fragment

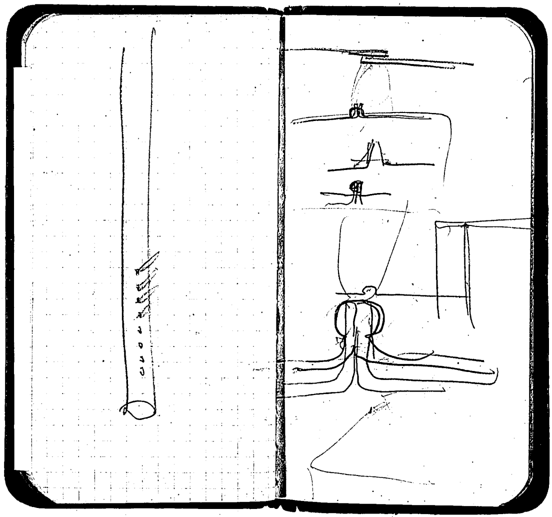
8222	243			
8223	337			
8224	267			
8225	217			
8226	337			

Another Group -
Reg E13. Ni ; group Reversed in
a Can 175° at 20 amp
for 24 hours

Another Group 48 hours.
Use Regular Irons not
treated —

2 more groups as
above but with iron
treated in Can hot
175° Reversed
24 hours 30 amp

2 more groups
with Fe treated Iron
+ then Reversed to
Anodes treated
24 hours 30 amp
Use in above CP
Nickel Sheet + Pencils

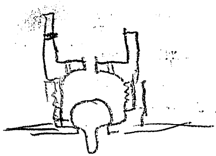


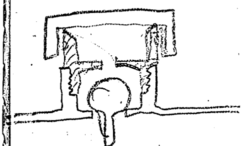
8) 50 10 Cells

7

120) 1728 (8

10



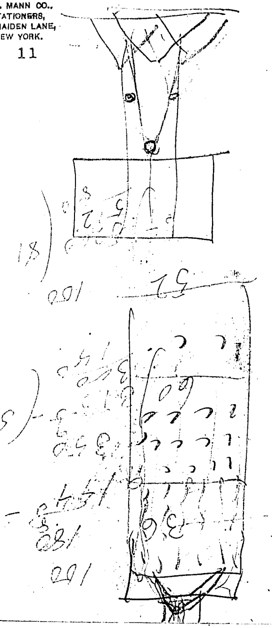


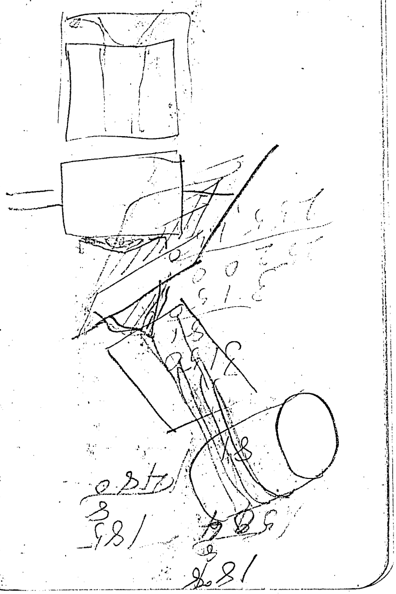
Notebook, PN-04-12-27

This pocket notebook was used by Edison during the period December 1904-March 1905. It contains notes and drawings pertaining to experimental work to be performed and reminders about business and legal matters. Many of the proposed experiments relate to the chemical composition of components for storage batteries and to the construction of groups of test cells. Included are tests regarding the charge and discharge of Edison and Gibbs cells, as well as experiments with nickel flake electrodes. Also included are notes relating to patent questions for Frank L. Dyer; business matters to discuss with William E. Gilmore; a plant operations matter for Emil Herter at the Edison Portland Cement Co. works; and questions about graphite for Edward G. Acheson. The undated entries at the beginning of the book may have been made at the Edison Portland Cement Co. works in Stewartsville, New Jersey. Among the employees mentioned in relation to individual experiments are Jonas W. Aylsworth, Robert A. Bachman, John F. Ott, and O. A. Rogers. The pages are unnumbered. Approximately 70 pages have been used.

PN-04-12-12

No. 11





~~Must have rotation~~
~~radius [illegible] grinding~~
~~wheels for Carbon~~
~~brushes only for Motors~~

~~Get spring or wire for~~
~~Nickel supply~~
~~Winding machine~~
~~nose players —~~

~~Blower in Dryer No~~
~~Oiling device —~~
~~Gear Casing Vibrates~~
~~too much - too~~
~~much noise~~
~~Rotten~~ — Motor too big
test for power

~~Dust chamber motor drawing 101 should have outside air if possible — or ventilator feed in somehow~~

~~Fan motor on fan at Dryer gives sudden thump, its not due to any belt slipping but some obstacle or gear climbing~~

How about the hole in end
of Motors where chain
is — notice fan at dryer
has hole open No 101
Motor is closed by Rubber
to the fan Ventilator
When none is used should
be closed permanently
& when Ventilator in
should be pkd wood —

Slowing down bus is
no good Except for a
block etc anything else
shut down —

Square pattern to 1"
Screen hole at Dryer
if we make it
E

In shifting Loads how about a case when you throw fields over to light line & you find that <u>open</u> = Why not weaken power generator field —

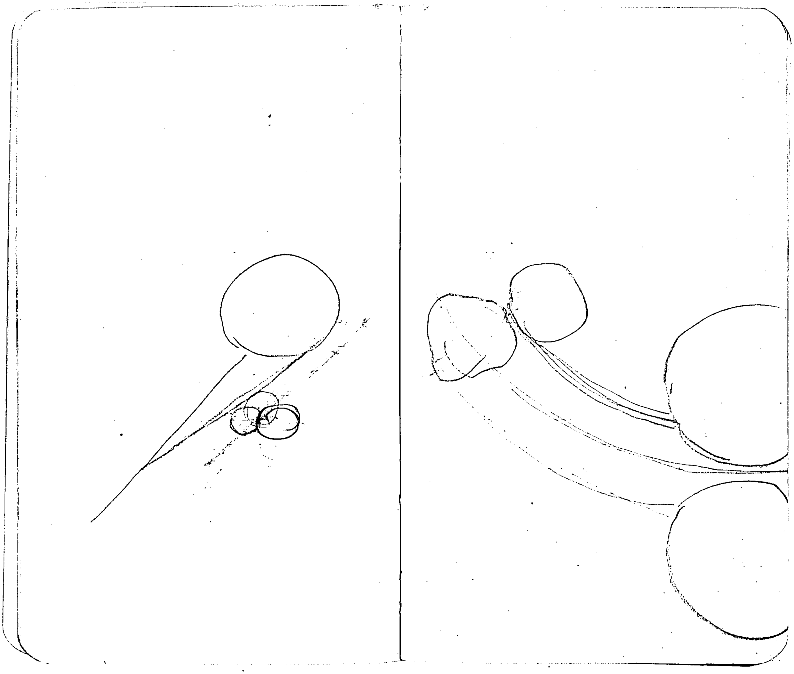
~~Send [illegible] Pyrometer back for Calibrating~~

~~Send to Lab for Big Hg Thermometer~~

Guaze guard over fans
on armature –

Tunnel for air for
Extension frames and Water
wood –

How are fan slingers
on Motors Locked



Dec 27 1904 — Bat

a + b Ferric hydroxides / Ferric Chloride dissolves out a hydroxide but not b — The a oxide in Ferric Cl are precip by adding Na Sulphate or Sul acid —

a is obtained by precip Ferric salts by alkali b is obtained by oxdn of Ferrous hydrate, Ferroso ferric or Ferrous Carb —

Spec g a 5.11 b 3.95 —

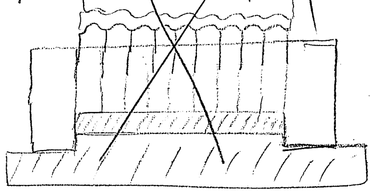
Can detect things in KOH by Evap down & dissolving in alcohol —

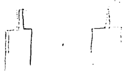
Put some Cups in 21% also CP nickel strips Also. Cold — another bottle 21% warm — another bottle, put iron, another bottle put cups plated 1/1000 more — another bottle, put Reg Cups & Rubber Wiens — date them —

Put a large bottle with 100 Cups in 33% warm for future Expmt

Dec 27 1908 ordered made

Then make sectional corrugating dies
7½ Corr to inch — OK Weber





Speak Gilmore + Weber about their
Estimates giving price piece work per man
Storage Bat —

Look up discarded aluminum
grids see if much come out

Take cups from 33% hot, wash distilled
H_2O, then hot alcohol test what deposit
is — Lime —

~~Move, Wolke up stairs + give him
fable + mixture clean.~~

~~group green NaOH, no prof 3.2
after pressing soak grain
alcohol 24 hours dry
3 hours~~

~~group as above but put in
33% 48 hours then water
50 hours, change water
2 or 3 times, then dry 6
hours hot plate, then
soak alcohol 24 hours
dry 3 hours~~

Soak CP grafite in water quite a while see if puffs when put in flame —

See if I have ~~[illegible]~~ 500 mlg Aluminum & 2 Phosphate — ditto H_2O_2

Dissolve some ore given in $NH_4Cl + NH_3$ see if any residue —

(Try 33% Capo soaked long time) in Alcohol see if lime sends come off — ditto Bengal — ~~[illegible]~~ appears good some —

Try Iodate K with resublimed [illegible]

~~Group 3 Capo & 2 Capo 1 gal in 33% —~~

Dec 28 1904

gets exact Molecular proportions

Try group with 2% KOH
" " $1\frac{1}{4}$% NaOH instead
This will determine relative
Conductivity ' ditto Double
above amounts –

group with pp Ferric hydrox
200 milg each cell –

ditto Ferrous hydrox
200 milgrs –

Changed this soaked 21%
1 gram to 100cc KCl
Soak 10 minutes –

Old 26 – in 21% with
100 milg KCl –

~~group - 500 mlg Alumina~~
~~& 2 grams Fluoride K~~
~~Each cell -~~

~~See if there was 2 grams~~
~~Fluoride in previous test~~
~~per cell or the whole -~~

~~Run old Alumina in~~
~~fresh KOH, see if recover~~

~~See about drawing up some~~
~~iron cells same size as little~~
~~bottle & plating them - also~~
~~work up a top & grid -~~

~~Look at Sulphide Ag H_2O_2 don't~~
~~possibly H_2S is completely attacked~~
~~in grids, without~~
~~with KOH~~

~~Group 250 mlg Al -~~
~~2 gram Silicate Soda~~

See if Silicate Soda pp
alumina — No

Group charged Gibbs
with 100 KCy mulg
Each cell,

Groups 1 gram KCy Each
cell — then fresh KOH
after 1st discharge —

ditto with 1 gram $CaCO_3$
+ 1 gram KCy — fresh
KOH after 1st dis —

Remove after soaking &
drying group gone bad by
alumina & put in new
pockets & [illegible] 21 gr
see if its Carbonates —

Group with Bergmann Lacquer
on inside Z Cells —
to keep off dissolving glass
Try Reg Group —
test Lacqr for alumina —
Edison test Lac by burning
see what it is —

ask Gwa if some cells have
sulphates cant it evidence
of lack Ba in KOH.

Gwa make some CP Rubber
+ Asphalt Varnish for
inside Endurance Cells —

~~Group with [illegible]~~
[illegible]
Iodine [illegible]

MG

~~Put in glass tube about 25" new sheet cut separately in 21% ditto. anneal tube and seal, draw glass to fine point set aside with date~~

ditto Cups — 21%

ditto Reg Ni 5 in groups set away for 3 months
21% do 12 1/2 NaOH for metal

Consult Hodges & Rogers & see if its possible to make a 4 to 4 1/2 /1000 Ni Cup — plating 1/2 /1000 making ~~[illegible]~~ 1/005

Phtalic acid - group

Try frothing with $12\frac{1}{2}\%$
Na OH from metal —

Mercury Diphenyl —

$HgO\,HgCy_2$ Oxycyanide —
K Picric —

Sodium Metaantimoniate —
only known insol Na salt,
its slightly sol — Try for AP —

Try Na or ~~K~~ Hypophosphite

~~Hurry up Bachman on
Moulds for little nickel
Jars — Hurry John
upon Castings big mould
also make these split
with 1/32 draft —~~

Be sure soak & remove ~
bad aluminum & put new
Cup =
also see about KCy in a
bad aluminum ~

Change [illegible] & start
new 16 book - 20000.

Follow up the Non pyrophor-
ic —
also the single one
with Hg only in solution
as C[illegible] —

Try [illegible] over Non Hg Iron
with Ferric Chl see if
dis[illegible] out anything
precipitate by Na Sulphate

See Fred Ott abt mistakes
in numbering dos 5000
Cups with aluminum

Take 5 Chgd Gells
treat hall alcohol —

Try $ZnCl_2$ in alcohol it dissolves

$2NH_4Cl\ ZnCl_2$ - double Chl
used for dissolving oxides
Zn Fe or Cu - for soldering
use Conc Sol —

There is a neutral Chl Zn

Protochl Tin Sol alcohol

$SnCl_2$ forms Double Salts
Keep from air = forms Double
Salt with NH_4Cl. Ba Sr &c.

Neutral & acid Tartrate Potash
dissolve alumina —

Try Tartaric A + its salts
again —

Tartrate of K · reduces Fehling & dissolves a number of oxides forming double salts —

Rochelle salt, K Na Tartrate,

~~Record abt spots Letter on Al_2O_3 etc in Rubber Mix Etc~~ —

K Nitrite — forms lots Double Salts Good clean gets nitrite

Alcoholic Potash Hot

Ferric Nitrate, dissolves Ferric OH, great many proportions, all sol Water —

ditto Mercuric Nitrate

~~Monkey with phosphate salts with Fe + also Alumina — perhaps · Al will not be moved in presence of Phos K Try group~~

Qua — see if Fe dissolves in presence of KI in KOH, ditto NiOH, or if Combines with $Ni(OH_2)$

See how ~~Fisher~~ getting along

Acid K Sulphate,

Acid Oxalate —

Groups dipped 1 min in Conc Sol Ni in NH_4 NH_4Cl dry to drive NH_3 off then dip 10 sec + dry between Each dip — several times —

Make another Sol NH & $NHCO_3$ + do same thing this is better as whole will go off by heat, Make group also Evap some of solution on watch glass see how it dries -

Are those Eyelet pockets Nickelplated if not send to phono works —

Try Benzol, Alcohol, CS on Little bottle graphite also CP graf see if anything dissolves out on Evaporation —

Soak 50 gibbs in bottle till no KOH by Litmus then make groups as Expmts show —

~~Get Jubilang no asphalt
also Rosin in Kerosene
also proper Solvent B.G.~~

~~See The 10% KOH No 2
Grg Cell Endurance~~ —

Try 500 mg Al in NaOH
12½% + one 6½%

ditto 500 mg Al in
KOH, 10% —

Treat a Reg group after
1 run + (a soak to get KOH out)
with Chloroammonia + NH, to lock the
particles together Electrically
also after ½ day Runs,
[illegible] get KOH out —
also [illegible] plates,
ditto do this on charged plates

See if its possible to dissolve
Ni in NH_4 without a NH_4 Salt,
also if not possible the minimum
quantity of the NH_4 Salt to get
strong Solution - Its OK substitute
Cl Ni NH_4 - for the NH_4 NH_4Cl -
also Ag in NH_4 =

Also Run 3 times a Reg
group - Soak get out all the
KOH, then treat with the
NH_4 Ni Solution, then dry & put
in KOH, take out & dry. hard
& then Soak KOH, 10 hours
& then Run Reg -

Run one of the Molasses say
5 after taking cold with
1% KOH, then ~~Ep~~ Run 3 or
4 times changing KOH,
then Soak water get KOH &
work with the Nickel ammonia
Solution

Ni_2O_3 dis in NH_4 without aid of NH_4 salt, OK

Run group several times then change nickels — Run these several times change [illegible] [illegible] [illegible] see if [illegible] [illegible] —

Manipulate the 26% —

Take 4 cups from 33% down stairs soak[illegible] until dry — then group [illegible] see how they run →

Make a die & make some narrow cups [illegible] 3/16 to grid —

Try in place Ni Cobalt Nitrite + use with & without K Nitrite in the 21%

Try 200 m[illegible] cal with 2 grammes Cobalt Hydroxide accdg to with K will not take a[illegible] from Co OH, but goes down with it — precipitating —

Try 200 m[illegible] with 2 grammes acetate Soda in KOH —

Make some Cobalt by H & use 8% Hg

Try KOH 21% containing 2 grms NH_4 — & use iron pocket against [illegible] see if more iron goes over with the NH_4

Group Ni Reg [illegible] charge
[illegible]
fully – take out and soak KOH free
dry & [illegible] same pressure [illegible]
[illegible] There may be big thing here

also soak in water [illegible]
ditto [illegible] Use [illegible]

ditto, increase [illegible] pressure to
150 atmos wash [illegible] –

all the above [illegible] clearly
& [illegible]

Can a [illegible]
[illegible] Nickel
to [illegible] & then [illegible]
[illegible] to dissolve it –

Try 150 [illegible]
150 Con on group of very thin
Cups & group .005 Cups –
also [illegible] one of
the heavy [illegible] groups
[illegible] Reg or [illegible]
[illegible]

Cup with graphite, [illegible] till [illegible]
Come together [illegible] times in CP
Ni [illegible] – ~~[illegible]~~ Niamino)

Reg charge fully [illegible], then
Charged again then washed free KOH
& dipped Niamino 3 or 4 times
drying between each when [illegible]
[illegible],

ditto same & then recarbonate
& dip 3 times again –

ditto new cups not [illegible] but has
multiple dips

Evaporate down some Niamino
see how [illegible] it can be made,

[illegible] in 33% then
soak water, get KOH all out then
treat Niamino 2 or 3 times

Chgd dis in 33 soak free KOH.
Reimpregnate – 4 Run Reg –

also as above but after C[illegible] [illegible] [illegible] a [illegible] [illegible] [illegible] [illegible] [illegible] in [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible] [illegible] w/ soaked
[illegible] 3 times,

Acheson graphite [illegible]
10 mesh on 20, [illegible] [illegible]
[illegible], then, soaked [illegible] [illegible]
[illegible] [illegible]

Also some of decomposed
Si Carbide. 1st [illegible] for Silica

See how porous the big block is –

Write Acheson see if can
graphitize Charcoal –
also [illegible] [illegible] [illegible] [illegible]
for all kinds samples –

[illegible]
Group Chgd [illegible] 33 g.
[illegible] free [illegible] then [illegible]
[illegible] [illegible] [illegible] new pkts –

Group [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible] –

10 Grams made with 180 mesh
sulphide [illegible], charges [illegible]
[illegible] KOH [illegible] free [illegible]
[illegible] [illegible], dry &
[illegible] [illegible] [illegible] new
[illegible] & Run with 2 Reg
[illegible] –

[illegible] 30 or 107 that I [illegible]
mix out, Try it again, get
[illegible], dry take into powder
[illegible], weight & put in new
Cups 100 smooth 150 Corning

Try plating onto a strip
from [illegible] [illegible] some
Nickel, up to an amount that
[illegible] group may need [illegible]
[illegible]

Group [illegible] [illegible] [illegible]
then the [illegible] whole cell reversed
changed then chg'd a [illegible] Reg
then Rev chge & chg'd [illegible] Reg
& so on see if can make it
[illegible] [illegible] [illegible] Reg —

Group ~~[illegible]~~ Ni put in iron
Cups no plating Reg press
+ Dup 150 S 150 C —

group 150 S 150 C with
250 [illegible] Alum —

Group [illegible] then get free KOH
dry + dip in [illegible] &
put in bottle for a couple hours
[illegible] so [illegible] has time to [illegible]
some Ni + then dry — + run Reg

group [illegible], get free KOH, dry
then powder + put in new pockets
Reg press

Dup 150 S/150 C

~~Make much of grafite process also dip & paint group of cups dry then use mix~~ [illegible] Ni wont oxidize to insulating anhydrous as grafite coated prevents

~~Try a green also,~~ with grafite painted cups [illegible] in 55% in ~~Ni dead 30 hours~~ [illegible]

Try Group with 3 grains Nitrate K [illegible]

Neg with 300 [illegible] previously

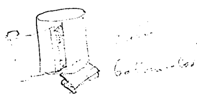
ditto 045 cups [illegible]

Notice position of Crystals Hg in Gibbs dredged Cups in relation to Covering —

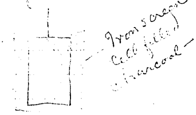
Group 2 mulg Aluminum powder in mix of each cup —

Test depositing from [illegible] Solution along on strips see which way it goes, ditto small [illegible] KOH,

Rubber [illegible] on Ni plated Can



Quadruple speed —



Expmt I want to sulphurize the Surface of Nickel by S & heat, (ie) pockets & then put KOH, see if attacks — also of Carbon Cor

Chg + [illegible] then chg [illegible] Soak till all [illegible] by [illegible] KOH gone, then discharge & charge & finally [illegible] Remove [illegible] hot [illegible] water, take out [illegible] & [illegible] if all broken up —

1894 Chem Soc Jnl. 550 — products, electrolysis Graphite in KOH, [illegible] also [illegible] [illegible] [illegible] Solution [illegible] a [illegible] Copious pp Calcium Mellate

$C_{12}Ca_2O_{13}$ also the filtrate after neutralization of the KOH gave pp with Ba Nitrate, on converting [illegible] into Sodium Salt then into Lead Salt & decompose the latter with H_2S in acid liquid [illegible] which when neutralized with NH_3 yielded Crystals Ammonium pyromellate & non Crystal hydromellate, says the [illegible] lost but little weight used Ceylon [illegible] by [illegible] at MP of Iron —

Set up a pair of Cups & use 300 Melaty Cups filled with graphite [illegible] [illegible] [illegible] from Carbonizing & [illegible] [illegible] test [illegible] for Mellitic Acid — end 2 weeks. Open & Examine [illegible] also weight it,

Fully chg + dis a reg then
Chg + Soak free KOH,
Cold [illegible] in water see if it
blackens + dont settle. Try
[illegible] if not better blacken
these [illegible] to sep group
+ then [illegible] [illegible]
see [illegible] Dukes —

2 groups chg dis chg
Chg — then free of KOH,
Run + look out for
Calliper — other
group heavy dis
[illegible] rate, look out
for Calliper [illegible]
[illegible] out

Make some thinnest
weight green that is possible
make 10/1000 frame from
sheet Ni — soak in 33% 24 hours
in CP Nickel Dish — ~~[illegible]~~
~~from Metal, R 21%~~
~~[illegible]~~ see how thin can make

With 3 plates I would have
1.75 grammes in pocket,

Make group 3. 2.8 2.4
2.2 2 1.75, [illegible]

also group with 2.4
afterwards dip in Nimino
5 minutes + dry —
also group charged + dis
then chgd + got KOH free
+ run —

[illegible] [illegible]
[illegible] through 20 +
graphite [illegible] weight after pressing

Also group with 100 [illegible]
200 [illegible] thin as [illegible]
[illegible] will allow —

Look [illegible] of [illegible] 33
[illegible],

[illegible] Ni [illegible] [illegible]
[illegible]

Also look [illegible] Nimmo
Ned by [illegible], [illegible]

[illegible]
[illegible] + several [illegible] Nimmo —
[illegible] magnesia in [illegible]
[illegible] Nimmo,
[illegible] E [illegible]
[illegible]
[illegible] Nimmo
Room — for [illegible] only

A Bartoli + G Papasogli
(Gazzetta 13-22-27)
(Gazzetta. 13 = p 37-55)
(Chem Centr 1881-327 328)
Chem Soc J - 1882 p 58 - 406 - 850)
(Acad dei Lincei 8 89 1779-80)
(Cimento 8-278 10 204)
(Chem Soc J 41 1883 p 592)
Chem Soc J 1886 469
Chem Soc J 1884 1239 - 177 -
(Bradse, Ann Chem + P C XIV 6)

Find Green Ni group + run in
500 mlg ~~alchemia~~ —

ditto ~~on the~~ group in
500 mlg ~~[illegible]~~ K —

My flake Ni also CO
in 10% KOH, also
NaOH,

Groups of 100 milamperes of following Cyanides
~~KCy~~ Ferrocy K

Kcy - ~~CoCy~~ ~~BaCy Kcy~~
" ~~CuCy~~ ~~AgCy~~ "
" LiCy ~~[illegible]~~ "
" ~~CaCy~~ ~~[illegible]~~ "
" ~~CdCy~~ ~~SbCy~~ "
" ~~ZnCy~~ ~~[illegible]~~ "
" ~~SrCy~~ ~~CuCy~~ Cobalt
" ~~LiCy~~
" ~~MgCy~~

all above double Cy all must dissolve in KOH 21% —

Group 2 ~~gone~~ Nitrate K

~~Try plating Ni on Hg in flat glass dish to get flakes — possibly it will amalgamate~~

Possibly Ni by H, cured
Coat the green particles thick enough by mixing
NH4 + fill up and

When get cramps and their pkts OK try knew a series of $Ni(OH)_2$ by the diff particles sizes of dry green bottle

---

Look at Curves see Calliper
Voltage & rod rate and green the
Old runs 2nd run —

Ask Dyer how Jones patent ever got to Supreme Court

Get from Merck some Mellitic acid —
Then put up group Reg and add 1 gramme to each cell - 2cc if goes
Good,

of the same series as Mellitic
acid Phthalic acid,
Terephthalic acid,
Benzoic —
Benzoic 1
Phthalic 2
~~Isophthalic 3~~
~~Terephthalic 4~~
Hemimellitic a 3
Mellophanic a 4
Unknown 5
Mellitic 6th —

plate on Magnesium
flakes —
plate on Zn then dissolve
(1-2) plate Zn then Ni
then local action —
KOH sol for Zn also
sulphate, $ZnCl_2$ KCl_2 etc —

No good then pkt in 33
chlorine — also only
chg hot.

Ring up big sheet, Copper
or brass polished plate Zinc
then Ni to strip Collect enough
to make a group 2.56 Ni
bal ni to 31.2 — 200 Corrugated

also try Copper in KOH & Zn Electrode

Try Magnesium in Reg Sul Zn
if don't go try in Zn KOH —
then nickel — Try Ni alone
try rate see if strip —

Use polished Ni, put in
Nitrate K for 5 sec ~~E~~
anode, then plate 4 minutes
take out wash put in
Nitrate again anode
5 sec + 50 on make
dozen dips see if
they separate,
possibly Zinc first,

Try paraffin etc on
Zinc squares, then plate
one of which is OK —

See Hunter about using
Block size of shafts
in lund [illegible] Sal zinc
Machine ~~Block~~ —
Everything else [illegible]

Makes slides sideways of
Blowers so any kind
in future drawers of
any kind can be put
in! —

3 grms greens charge
against ~~KCy 100 mlg~~ strip soaked
KOH twice then
put in fresh KOH ~~&~~
run —

ditto Chg discharge
same KCy 100 mlg
same operation

Dip with Jersey K —

Group 3 grm green Charge
5 hours rest 10 chg 5
rest 10, chg 5 rest 10
Chg 5 total chg 20 hours
then, discharge —

also chg 33% hot, 5 hours
rest 10 hours chg 5
rest 10 & so on till
15 hours in Jan 125 —

Soak old 2k free KOH
dry & reoxygenate 300 at

E18 — 10 grms KCy
Charge against Cast
then pour out sol put
in KOH soak charge
again till no KCy
Noticed Have 7
Changed —

group Iron no Hg charge 24h against
strip in 500 cc KOH 21%
Containing 500 milgms Cyanide Mercury
Open one iron sec of [illegible] -

also charge Group Ni 500 cc KOH
Containing 250 milgms Ferrocyanide
K - ~~[illegible]~~
Then put Ni & Irons together after
Soaking out the HgCy &
Run Reg -

Soak doz Gibbs dried pkts
till free KOH, dry - then take mix out of ~~[illegible]~~ 64
weight - then powder & put
in new pkts, ~~Reg~~ & press &
Cor ~~[illegible]~~
200 atmos -

group green ~~[illegible]~~ just as it
is (Coarse) in big bottle
dont crush -

Try with fingers prelim Expt
Covering green with the flake
nickel damp -

Paint streaks on Copper strips
with Bergmann Varnish then
plate Zn & Ni & East off acc
of Varnish permanent,

Squirt green NiOH in Cake
form -

Iron Cr Co Mn are the
ones that form with Cy
a Complex molecule
cobalt acting as radical
use these in bath

group Reg Ni 2 milgms
another 5 milgms
another 10 milg Ferrocy it
maybe a catalytic -
ditto green Ni groups

Big Magnet over coal belt
feeding to Coal Rolls
Catch iron —

Feby 28 1908 Cakes to soak Ni salts
in & Red by H, a after dec out
Stuff of Cake

Carb Ca Sr Ba Mn Mg Sb,
Zn

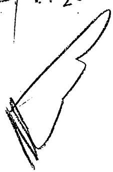
Acetate Zinc sublimes at 190 C
Mix with Non Volatile subs —
also chl amm, phthalic [illegible]
Chloride Ni - Carb NH,
Sulphate ammon · Arsenious Ox
V at 218 C
Arsenates of Iron Mg Ng -
Burnt alum
Asbestos Coated Ni Red by H,
Benzoic acid subs at 249 - Lamm
Benzoate Magnesium see what it does
Borates, Ca Mg
Carb Ba strong heat is decomp - Sr ditto
powder mixed with Collodion
Gum cont, Flowers Sulphur
Ni mesh stuff with MgO diff proportions
also with Volatile

3 of anhy ox Ni 1 of amc
OK — 2½ to 1½ 100 mesh
NHCl ... 62 got very fine
& Grad up slow —

Heat of Combination

CoO H_2O 63.4
Co_2O_3 $3H_2O$ 149.3 — 0.7
2 $Co_2O_6H_6$. O. H_2O. further ox of Co_2O_3

NiO. H_2O 60.84
Ni_2O_3 $3H_2O$ 120.38
2 NiO_2H_2 O. H_2O — 1.3



~~Co.O. H_2O. 63.4 Monoxide [illegible] from metal Ox 49 [illegible]~~

Co Hydrate, 63.4
Co_2O_3 " 149.3
2 $Co_2O_6H_6$ O. H_2O — 0.7 further oxid'n

Ni Hydrate 60.84
Ni_2O_3 " 120.38
2 - NiO_2H_2 O. H_2O — 1.3 oxdtn, from Monox to Sesquioxide

Mch 5th 1905
Mix Reg [illegible] with Molasses dry then Crush to through 20 on 100 - Coat Nickel flake - graf - Bismuth etc also no Coat good for filling

Mch 5 1905

Mix swelling with $Ni(OH)_2$ + flake Ni after flake or dry that is oxidized & on discharge will be reduced & soluble in the KOH, so swell can Cake placed in discharge without swelling probably HgO possibly Bi Ox

Flakes—
Ni 10% Co 90% alloy flake by Rolls
" 20 " 80
30 70 + so much
Ni 90 — Co 10
Ni flake plated Au Ag Pt, Sulphides

Try Ni_2O_3 anhy with also Co_2O_3 anhy
Cobalt flake also Ni
Molasses —
powdered Tungsten Bronze for Conductor in place of Ni flake —

Mch 5 1905

It is advantageous to size the $Ni(OH)_2$ as large as possible say through 15 on 30 but possibly for commercial reasons may have to go to on 100 the finer powder to then ground fine & returned to the fresh Ni product reduced to be oxidized over again — The coarser the particles the less flake is required to cover it & more porous the Cake will be —

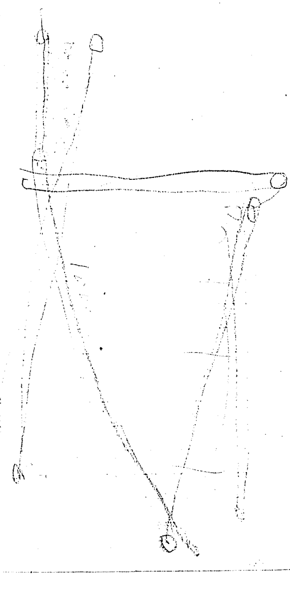
Heat Uranate Na & K see if Carbonate afterwards

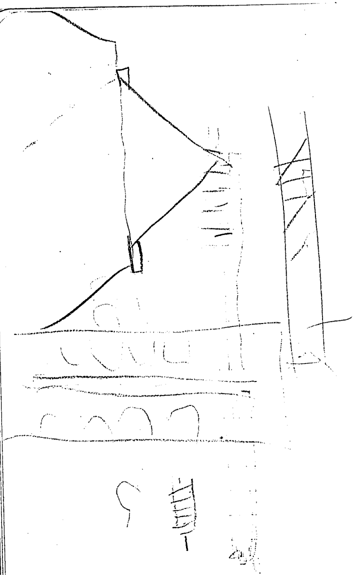
Ni flake Coated Ni_2O_3 anhy mixed — also $NiCO_3$ 1/2 Coated CO_2 + then made anhy dried.

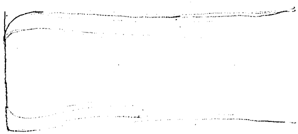
Look at grafite from old No 26 Cup by brautomilled Supt.

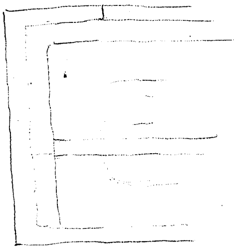
Mch 5 1905

Charge + dis a pocket
with metallic flake
put in vacuum process
then take out dry +
recompute —
also another pocket
10 min H_2O - dry +
recomp - see if perm
swell lessened + if
it will keep so —









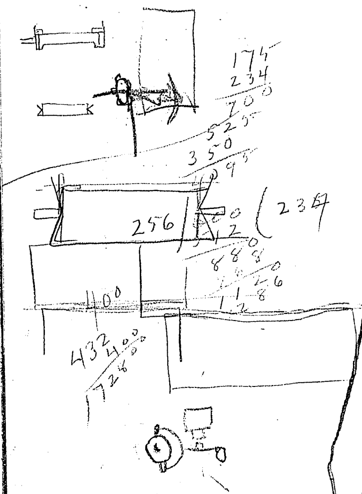
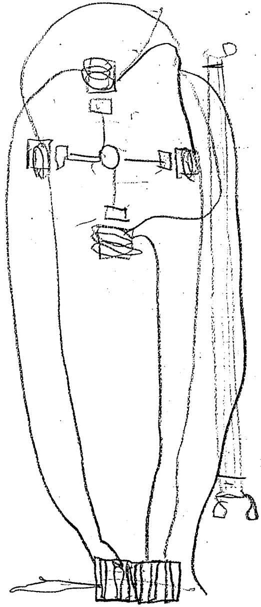
1" ft sqr. $\frac{1}{4}$/1000 thick 1/2 both sides"
2000 dips to get 1 sqr ft 1" thick

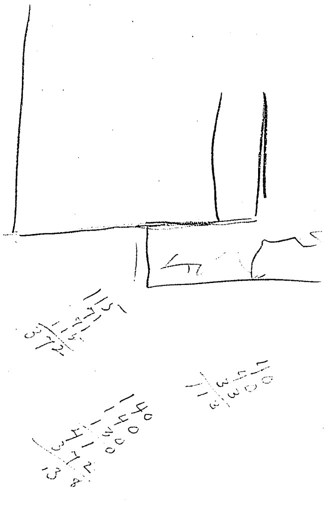
100 plates. 100 dips daily –
is equivalent to 10000 dips –
or ~~1~~ 1" sqr ft 5" thick
or 39 × 5 = 195 lbs –

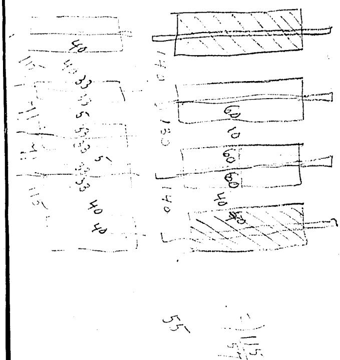
280
200
445) 5600 (12
445
1150
890

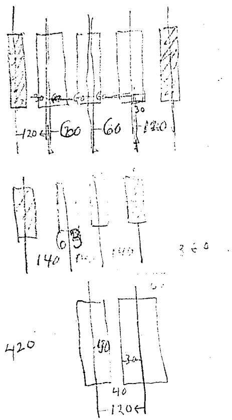
445) 28000 (–

175
200
35000
700

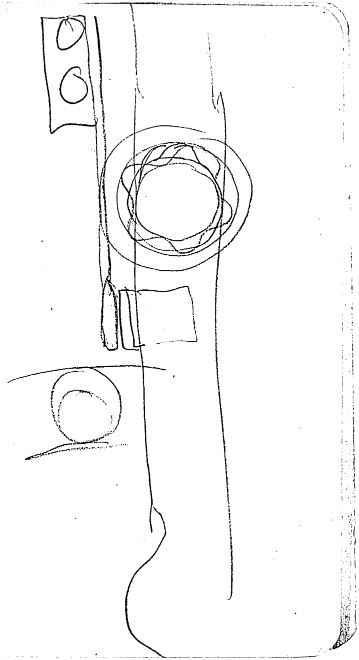

175
234
700
525
350
256
234
888
400
432
400
1728








30
60
60
30
120
60
60
120
140
360
420
90
40
120



256-
3)572
171

1.75

1.75
2)262

33
2641

1.75

3)200
66

.5

60-

40
48
88
3
264

4

5 1/4 lbs-

88
18
704
88

28

12
18
96

264
33
864

1.75

24
72

1584
756
2340

5.24

5
472
.53

88
12
1056

1050
1056
2784

.53 lbs-

3)40
13
27

288
8
2300 —

100000
9200
8000

44 —

44 cells —

80 cells

6.2
2.2
124
1.4
124
1364

1364

1728
1364
36

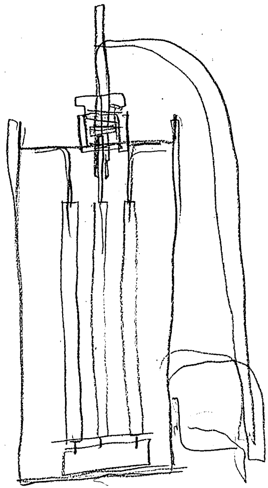
1.3

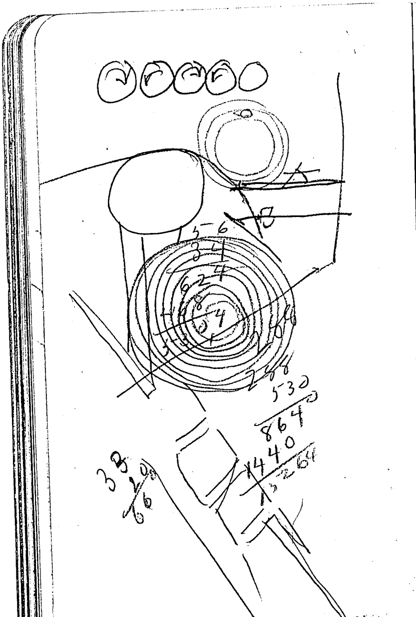
12
19
108
1.2
1.38
2

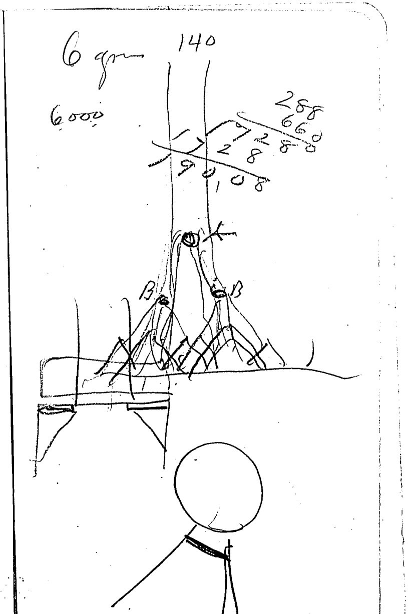
21
29
189
1.42
609

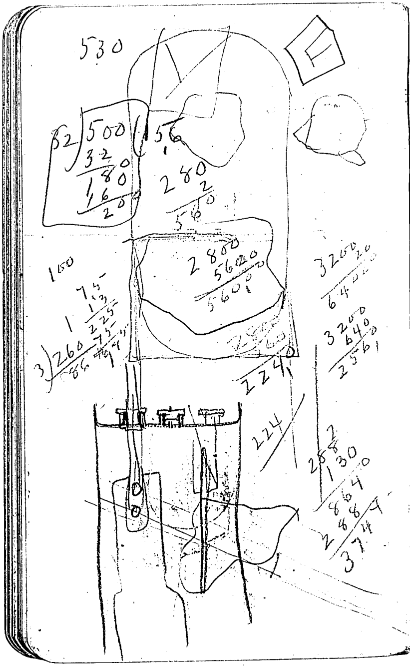
445

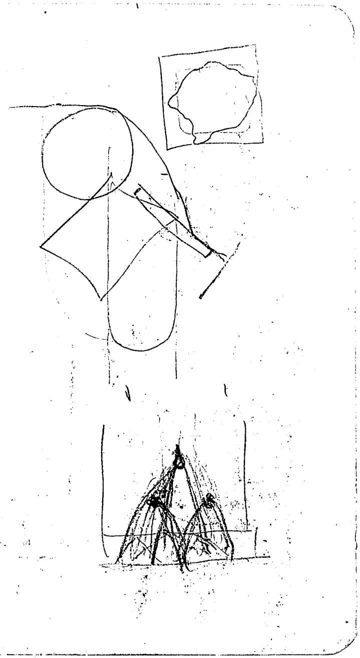
1.6
3
4.8




530
864
1440


140
6000
288


530
32)500
32
180
160
20
56
280
2
560
2800
5600
5600
100
75
3
225
3)260
3200
640
2200
640
2560
224
224
288
130
864
288
3744



Notebook, PN-05-03-05

This pocket notebook consists of a calendar for 1905. It was used by Edison during March 1905-April 1906, and again during early 1908, primarily for notes regarding experimental work and other matters to be undertaken at the laboratory. Many of the proposed experiments pertain to the chemical composition and performance of Edison's alkaline storage battery. These include investigations of swelling in the positive electrode pockets, tests of various tubes for the same purpose, related chemical research, and the notation of mileage and routes for an electric vehicle. There are numerous experiments on metallic flake for battery electrodes, including one on cobalt flake marked "Curious!" A few notes and drawings relate to experiments with phonographs. The book also contains notes about the location and availability of cobalt ores in North Carolina and elsewhere. The North Carolina entries are copied from a book identified as "Wurtz." Included as well are notes about arsenical compounds and reactions; notes about the properties of bismuth; an entry by Edison reminding himself to notify Frank L. Dyer about filing a patent application on the use of cobalt in storage batteries; and some rough calculations and measurements, including cost analysis figures for the Edison Portland Cement Co. works. Among the employees mentioned in relation to individual experiments are Ralph Arbogast, Jonas W. Aylsworth, Otto Groethe, Frederick P. Ott, John F. Ott, and Ludwig F. Ott. Some of the entries may be difficult to read because of bleeding purple ink or smudged pencil. The pages are unnumbered. Approximately 200 pages have been used.

PN-05-03-05

Leib
Mors
250 Monell
30 Churchyard
750 Earle-Nipping

250
30

Things Easily Forgotten.

No. of Watch Case..............................

No. of Works..............................

No. of Bank Book..............................

No. of Bicycle..............................

My Weight on ....lbs.

Height..............................

Size of my Hat..............Gloves..............

" Hosiery..............Collar..............

" Cuffs..............Shoes..............

" Drawers..............Shirt..............

This book belongs to

....

In case of accident notify

....

Wea. SUN. JAN. 1, 1905 Ther.

Feby 28 1905

Cokes to soak Ni salts [illegible] Real by H. [illegible] dies out the [illegible] of [illegible]
Conb Ca Sr Ba Mg [illegible] Sr Berder

Acetate Zinc [illegible] at 493 [illegible]
mix with non volatile [illegible]
[illegible] Amm [illegible] Phthalate [illegible] Coke [illegible]
Willy Sus [illegible] the Arsenious of [illegible]
Volatile [illegible]. Arsenious of
Volatile 218 C, [illegible]

Condr in place [illegible] [illegible]
Soaked Ni Salt Reduced by H.

$Ni(OH)_2$ might [illegible] [illegible]

Amm Chl Ni NH_4Cl [illegible]
of Coke [illegible] The [illegible]
[illegible] [illegible] Te
Coke [illegible]
Am Cl [illegible] [illegible] then
NiCl [illegible] [illegible]
ceased alone R by H.

Wea. MON. JAN. 2, 1905 Ther.

Wea. TUES. JAN. 3, 1905 Ther.

Mch 5 1905 = to make neg more workable at factory mix with molasses enough to stick & then dry - powder & screen to workable size - put in pockets press & soak out ~~sugar~~ -

Make alloys Ni & Co to make flake by rolls & oil process following from 90 Ni to 10 Co varying 10% down to 90 CO to 10 Ni & make into cells -

Clean the Ni flake by Rolls & oil process by Hot Hydrogen also CO

Try Ni flake plated with Au Ag Pt

Try Anhy Ni_2O_3 with flake Co at 1st & if OK try with flake Ni

See if Tungsten bronzes will stand OX in battery

Wef.

Wea. WED. JAN. 4, 1905 Ther.

Wea. THUR. JAN. 5, 1905 Ther.

Mch 5 1905

It is advantageous to [illegible] the $Ni(OH)_2$ particles thro 15 on 30 but as this is not very [illegible] can make it thro 15 on 100 mesh making as much coarse as possible this requires less Metallic [illegible] flake to coat surface [illegible] if it were finer That passing 100 mesh is ground [illegible] put back with [illegible] $Ni(OH)_2$ & dried with it & Reground

Heat Uranate Na & K & see if Conductor also in hot Hydrogen

Ni flake coated with Ni_2O_3 anhy fused - also Ni Co alloy ½ & ½ coated Co_2O_3 & then made anhy

Look at very thin flakes of graphite from old 26 cell by transmitted Light

Wea. FRI. JAN. 6, 1905 Ther.

Wea. SAT. JAN. 7, 1905 Ther.

Mch 5 1905

Get some Ni Cups which have been run long time & are yellow tinted & [illegible] a [illegible] will clean it or [illegible] solution where it can be [illegible] electrolytically

Get a couple 30% good Cu pockets dry [illegible] KOH & Recover [illegible] 15 — [illegible] soak 10 [illegible] H2O [illegible] & put back in 33% [illegible] swell [illegible]

[illegible] [illegible] Ni Strip [illegible] KOH —

Wea. SUN. JAN. 8, 1905 Ther.

Wea. Mch 5 1905 MON. JAN. 9, 1905 Ther.

H- Li Be B C N O F Na Mg
K Ca Sc Ti V Cr Mn Fe Co
Ni Cu Zn Ga Ge As Se Br
Rb Sr Y Zr Nb Mo Ru Rh Pd
Ag Cd In Sn Sb Te I
Cs Ba La Ce Di Yb Ta W
Os Ir Pt Au Hg Tl Pb Bi
Th U—

Insol KOH. Ni Co Mg Fe
Cd Ce Ur Hg Ag Bi
Cu

Put up following Cups
Silver 70 Co 30 Ni
80 Co 20 Ni—
Cu plated Ag—
Cu plated Pt,
Sulphurized Ag—Ni
Co—Cu 720 Pb Cd W Bi Mo Mg Cr

Wea. TUES. JAN. 10, 1905 Ther.

Mch 5 1907

Wea. WED. JAN. 11, 1905 Ther.

~~Selenide Ag Could be
deprived of all the Selenium
by roasting or even
fusion by Alkalies –
Try Strip ag Sulphuret
also Selenide –~~

~~graphitoidal Silicon
Silicides~~

~~graphitoidal Silicon not
not attacked by
Nitric or Chloride
K Boiling or Alkalies~~

~~See if Rutile Ilmenite
Chromite or Corundum
also Molybdenite~~

Wea. THUR. JAN. 12, 1905 Ther.

Mch 5 1905

Wea. FRI. JAN. 13, 1905 Ther.

Silicon alloys Ni Co
Etc —

Niobium Nitride Conducts
Elec — dull black powder
not attacked by Nitric
Scarcely by Aqua Regia —

To make Nitrides
electrically use the
metal as Positive
& Platina Neg in
Ammonia Chloride

TAE

Wea. SAT. JAN. 14, 1905 Ther.

Wea. SUN. JAN. 15, 1905 Ther.

Mch 9 1905

Molybden Phosphide -
Conducts Elec

Tungsten Nitride
not decomp by
acids or alkalies

Write Bergmann
about the Vaporizer
for Cams [illegible]
also the Stuff
from Standard Oil -
for Cramps

Wea. Wed [illegible] 1905 ~~MON. JAN. 16, 1905~~ Ther.

plate Ni on Iron
both sides, then roll
out to flake & cut
iron out - weld by heat
also plate Ni + Co
60 Co 40 Ni on
iron - then weld
in Hydrogen - & roll
out to flake &
Eat out [illegible]

Wea. Wed [illegible] 1905 ~~TUES. JAN. 17, 1905~~ Ther.

[illegible] product with
anything porous - clean
with Hg - 72 sides -

If the trouble with
[illegible] with Metallic
Nickel in H
form a hydride -
then Reduce in
CO, If N, then
use Mg & Titanium
in atmos free
of N -
The plated Ni Co
Semi alloy
Heat in CO & weld

Wea. WED. JAN. 18, 1905 Ther.

Wea. March 9, 1905 ~~THUR. JAN. 19, 1905~~ Ther.

or in Vacuo previously
displacing air by
CO_2

Take 2 [illegible] 33% chgd
dry with KOH [illegible]
Then [illegible] 200 -
Then soak in water
then put 1 in 33%
the other in 21%
see result

[illegible]

Plot result of green
[illegible] on 20 [illegible]
see which greatest
with Cor[illegible] of [illegible]
also Comp [illegible] small [illegible]
Cor & Reg Cor 33%

Wea. Wea. FRI. JAN. 20, 1905 Ther.

Wea. Mch 10 1909 SAT. JAN. 21, 1905 Ther.

Make a Co by H powder 15% Hg Run on other side get chg Voltage & dis chg output, Etc

~~Curious! why dont strong alkali decomp the black Ni_2O_3 & Co_2O_3 & take out of the Cups that had Cobalt flake —~~

Edison

See if Sugar + [illegible] solution [illegible] will remove Copper from grease MnO_2 Tank 48 hours —

Wea. SUN. JAN. 22, 1905 Ther.

Wea. MON. JAN. 23, 1905 Ther.

Mch 11 1905

Make pockets [illegible]
Corrugated with one
end open [illegible]
put in Hydrogen [illegible]
together then fill [illegible]
[illegible]
[illegible]
Light [illegible]
[illegible]
[illegible]

Could fill continuously
by assembling [illegible]
[illegible] Continuing
filling [illegible] $\frac{1}{2}$ [illegible]
[illegible] there
[illegible] 5th [illegible]

Wea. TUES. JAN. 24, 1905 Ther.

Wea. WED. JAN. 25, 1905 Ther.

Mch 11 1905

See Curve of [illegible] on the group chart had of [illegible] Cubes in

~~Make the flag 2.8 with .6 of 13/1000 glass [illegible] mixed to get pr[illegible]~~

When get plenty of flakes make group 20 or 30. then sift in when in cup 150 mesh fine to fill pores or interstices, & press

Sift 20 or 30 - fill cup pour melted paraffine in press & dissolve Paraf out

Wea.	THUR. JAN. 26, 1905	Ther.

Wea.	FRI. JAN. 27, 1905	Ther.

or what will be better
perhaps put cups [illegible]
+ hand [illegible] then fill it
with paraffin by dipping
heat & cooling them
[illegible] [illegible] thus have
porosity, possibly smaller
[illegible] than paraffin bottles
See [illegible] [illegible]
[illegible] [illegible] paraffine out
The paraffin [illegible] out [illegible]
~~[illegible]~~ Sugar afterwards

Use 20 in 80 filter
Crossed Up

[illegible]

Wea. SAT. JAN. 28, 1905 Ther.

Wea. SUN. JAN. 29, 1905 Ther.

Make some the flake
burn it till all oxide
then reduce in H.
to get rid of N.

ditto reducing in
CO to get rid H &
N—

Try German Silver
flake—

Wea. MON. JAN. 30, 1905 Ther.

Wea. TUES. JAN. 31, 1905 Ther.

alloy of Ni & Aluminum

Al_6Ni large thin white laminae SG 3.67

by melting 8 pts Al

with 3 pts sublimed

NiCl + 20 pts

Chl K + Na & heating

repeatedly with dilute

HCl —

Ni_2Sb_2 Thin plates

this would work

in Na possibly

Wea. WED. FEB. 1, 1905 Ther.

Wea. THUR. FEB. 2, 1905 Ther.

Ni 50 Cu 50 - plate out the Copper - use of dfalls pieces -

Fe Red by H, & allowed absorb CO_2 so not pyrophoric - Test

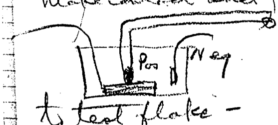
see changing Economy of Soft + Hard pressed Irons

Wea. FRI. FEB. 3, 1905 Ther.

Wea. SAT. FEB. 4, 1905 Ther.

Treat a Neg E18 — when free from KOH by Bromine water after reversal to get all the iron in the nickel grid in the metallic state — possibly bad contacts bet pocket & grid —

Make Control Test



to test flake —

Wea. SUN. FEB. 5, 1905 Ther.

Wea. MON. FEB. 6, 1905 Ther.

Swell may be largely
due to crushed +
compacted surface
in contact with pkt.
+ very closed holes
so friction of gas exit
at holes very great
Try flake 60 Co 40
Ni green in cups
with very open holes
can file them open
then see if swell
diminished — or
also thin + fine
CoNi Red by H
Stick on outside
flake by machine

Wea.	Tues. Feb. 7, 1905	Ther.

Wea.	Wed. Feb. 8, 1905	Ther.

to give gas passages

group Reg. 700 [illegible]
chlorine [illegible] mixed [illegible].
Corning 200, Soak
Nacl fuse, 150 mesh

group [illegible], Cor 200
Soak, R[illegible]
200 —

group Cor 200
these right off
without soaking

Wea. THUR. FEB. 9, 1905 Ther.

Wea. FRI. FEB. 10, 1905 Ther.

Put grid in electrolyte charged [illegible] [illegible] about 10/1000 [illegible] [illegible] 2/1000 [illegible], for 2 [illegible] then remove clamp —

Ed

Wea.	Sat. Feb. 11, 1905	Ther.

Wea.	Sun. Feb. 12, 1905	Ther.

Johnson make model
filler & gauges
Top cell - welded

See about Cobalt
plated cups -
See Webber about
the balling points
drop [illegible] together
Changing [illegible]
& doing away soldering
top parts, etc. covered

Wea. MON. FEB. 13, 1905 Ther.

Wea. TUES. FEB. 14, 1905 Ther.

Warren make
60 Co 40 Ni by way
Ni plated & Co plated
scales .20/1000 thick

Na fluoride melt 935° C

~~Co Na ?~~

Sulphate K 861
" Na 865

Carb K 834
" Na 818

Ni 1200 to 1400 C
powdered Iron Scale
thro 30 on 60.
mixed with Ni flake
or Ni CO flake -

Wea. WED. FEB. 15, 1905 Ther.

Wea. THUR. FEB. 16, 1905 Ther.

Heated yellow white in Hydgn then won eaten out,

Phosphate Lime -
get some apatite powder
thro 30 on 60. cover flake
over 150 [illegible] cover then
soak out [illegible]
Re Cove 200 - then to welding
heat in the [illegible]
out lime with [illegible]
also fuse pieces [illegible] lime.
See Lowe about the
pure fused [illegible]

Mix Magnesia with
minimum Molasses, press
& dry, then powder &
press 30 on 60.

Wea. FRI. FEB. 17, 1905 Ther.

2000
300
600000
30
18000000
200
1,800,000
2000) 3600000
2000
1600
1600

Wea. Wed Dec 16 1909 SAT. FEB. 18, 1905 Ther.

MgO, moist with Carb K water press & dry - then powder & screen 30 on 60.
Coat flake Ni with [illegible] dissolve out [illegible] & Carb K - & [illegible] in [illegible] dissolve out Mg by HCl —

[illegible] Carb Mag magnesite, carbonate on heating [illegible] first [illegible] it,

Ralph to make
Iron by H, then press
N in H[illegible] to see if H
absorbed, Reg [illegible]
[illegible] test —

Wea.	SUN. FEB. 19, 1905	Ther.

Wea.	MON. FEB. 20, 1905	Ther.

Speak to Gunn about
danger of Nitrogen in
over Hydrogen & necessity
of a Buffer in the
metal to be reduced
— H or [illegible] —

ortho
Trimagnesic phos
or Neutral salts is
anhydrous after ignition
it readily [illegible] in excess
even after exposure to
white heat & is very
much better than
Phos Lime — Very
high eff —
formed by pp Sul Mg by
trisodic phos

Wea. TUES. FEB. 21, 1905 Ther.

Wea. WED. FEB. 22, 1905 Ther.

Phos K melts [illegible] at
higher than red
Easily sol [illegible] del -

Trisodic ortho phos
does not melt at [illegible]
red heat,

Put 1 gram .0001
in Cup of Smooth glass
25 atmos, weld in H,
also 1 with 1 gram
.0003 — same press

Wet MgO with
Boracic acid solution
ignite to white
$MgNO_3$ — $MgSO_4$
Mg acetate,

Wea. THUR. FEB. 23, 1905 Ther.

Wea. FRI. FEB. 24, 1905 Ther.

Java give me Crys(?) Ni flake hydroxide. I will cover it with Ni flakes - 0001

~~Try BaOH in a Solution of Sulphate of Ni + Am — in presence of Excess NH_3 so as Ni OH dissolves~~

Get those Amine Liquids & test chemically $NiOH_2$ & flake hydroxide

Wea. SAT. FEB. 25, 1905 Ther.

Wea. SUN. FEB. 26, 1905 Ther.

Try dis $NiOH_2$ in
Hydrazine also Co
$Ni OH_3$ also
Hydrogene in $NiOH_4$

Oxygen make the
plating off graphite
Co instead Ni
also Ni Co —

See claims +
look more closely
to Cobalt alloy
+ Co alone
patent
unpatented

Wea. MON. FEB. 27, 1905 Ther.

Wea. TUES. FEB. 28, 1905 Ther.

Mention Sublimed Chloride, scales treated K + Red Hydrogen -

Mch 6 1905

Put in about 2 grms Cobalt flake (best) make 3 grids & put them in 21% with 200 Mar density charging & discharging: see result, though accurately want to determine how long the flakes last

Wea. WED. MARCH 1, 1905 Ther.

Wea. THUR. MARCH 2, 1905 Ther.

Mch 16 1905

alloys with Nickel
for flake

Manganese (lead?)
Ag - Mo Wo Cr Ur
Sb Ce Fe Cu
Bismuth

Volatilize by sublimation
a mix of 60 Chloride
Co 40 Nickel, both
hydrated, dried [illegible]
[illegible] [illegible] [illegible],
if so can reduce by
H + use in Cupel
for sponge

for making flake by
rolling [illegible] [illegible]
[illegible] [illegible] [illegible]

Wea.	FRI. MARCH 3, 1905	Ther.

Wea.	SAT. MARCH 4, 1905	Ther.

Nitrates of Co & Ni in
right proportion & reduce
by H & roll out,

Paracyanogen
is Conductor

see in Collection of
gold [illegible]

from Oxalate Uranium
U is deposited as a
hydrated Ox

alloy with Tellurium
for flake

Wea. SUN. MARCH 5, 1905 Ther.

Wea. MON. MARCH 6, 1905 Ther.

Judging from reading
Tellurium with Ni
would be ok for plates

when of 60 Co 40 Ni
plate make group
for 5% KOH, 8%
12% 21% 33%
plain with Reg
grain holes —
to determine capacity
& swell — bath
in Na & KOH.

Wea. TUES. MARCH 7, 1905 Ther.

Mch 16 1905

Wea. WED. MARCH 8, 1905 Ther.

Sponge cups dip in
conc $MnCl_2$ dehydrate,
dip again till nearly
full. Then soak weak
KOH, till chl nearly out
then boil strong KOH
decomp [illegible] hrs,

Co & Uranium - Metallic
serves to prevent
deep ingress of Electro
action & don't [illegible]
[illegible]
Uranate,

Co & Sb in NaOH,

Co & Mg -

Co & Cerium -

Co & Fe -

Wea.	THUR. MARCH 9, 1905	Ther.

Wea.	~~FRI.~~ MARCH 10, 1905	Ther.

Co [illegible]

Speak Ayers -
Phos Trical cic
after washing H &
Eating out acid -
put again in H &
a loose Camp clean
[illegible] of [illegible] mentions
many dips -
also speak of
Sol of Carb H&t HH y
& KOH after a number
dips etc -
Make Statement Nj
for pulh not very good

Wea. SAT. MARCH 11, 1905 Ther.

Wea. SUN. MARCH 12, 1905 Ther.

Noted alloy Co+Ni or
Co alone filler or
Nickel makes contact
without pressure other
than its own weight
whereas Ni requires
some pressure to ensure
good contact this
could be attained
by repressing after
filling but disadvantage
is closing more or
less air passages &
impeding circulation

Try Co flake use
of KCl clean it

Wea. MON. MARCH 13, 1905 Ther.

Wea. TUES. MARCH 14, 1905 Ther.

of 20 [illegible]

Rogers to Expert on drawing tit on side can deeper -

Mch 22 1905

Try of alcoholic ammonia solution

Ni(OH)2 in dropping - + if more than water solution

not so much

Wea. WED. MARCH 15, 1905 Ther.

Wea. THUR. MARCH 16, 1905 Ther.

[illegible] formaline
NH4 in ice will
dissolve more —
[illegible] one of the
[illegible] NH4 [illegible]
NH4 [illegible] [illegible] to
the solution —
[illegible] squeeze out
water in bag —
Hydraulic & Chem
dry on heater
Use Ice around
jar when dissolving
[illegible] NH4 [illegible]
through —
1.25% dissolve

Wea. FRI. MARCH 17, 1905 Ther.

March 23 1905

Wea. SAT. MARCH 18, 1905 Ther.

Dally make some glass prepared perfectly, then fell by giving see saw at 2020 - much of glass downwards

~~Hard Caustic~~
~~[illegible] Baryta,~~
~~wet with Conc~~
~~Sulphate Mi-~~
~~Dry & Red with~~
~~lit~~

Wea. SUN. MARCH 19, 1905 Ther.

Wea. MON. MARCH 20, 1905 Ther.

Mix much NiOH
with lime hard
burned particles,
Redman on it, &
slake lime to
make flake

Try peroxide from
igniting Nitrate
with MgO?

See if the Oxide
NiH? Can be E

Wea. THUR. MARCH 23, 1905 Ther.

Conc by quick lime
put in solution to
absorb the H_2O
& liberate free
NH_3 which
can be absorbed
in water -

1 Hyd atom may
be replaced by
Ni & the resultant
compound stable
unlike free NH_3

Wea. FRI. MARCH 24, 1905 Ther.

Draw patent
on Co & NiCo
in Reg cell -

Wea. SAT. MARCH 25, 1905 Ther.

April 21 1905

[illegible]
with [illegible]
[illegible]
[illegible]
[illegible]
white [illegible]

[illegible] Co Cl [illegible]
glass Vacuum -

[illegible] Alum mixed
with [illegible] Co
[illegible]
& then Reduced [illegible]
[illegible] flake Co

Wea. SUN. MARCH 26, 1905 Ther.

Reconcile
[illegible] Co & Ni
made in [illegible] Cylinder
& [illegible]

[illegible]

[illegible] Zinc [illegible]
195 C [illegible]

Warren make some
70 Co 30 Ni flake
for Test as a sheet
00005 0001
0002 0003.
Louis Ott put these
up

Wea. MON. MARCH 27, 1905 Ther.

also 60 & 40 —

also 70 Co 30 Fe

60 Co 40 Fe try Electroly

Sept 25 1905

Wea. TUES. MARCH 28, 1905 Ther.

Ferricy of K & Protochl Co
pp in thick dark red
flakes Gmelin

Cobalticy of K formed with
Sol Ni + K gives light
azure colored flakes

Ammonio-Cobalticy Ni
formed by dis ppd Cobalticy
Ni in NH_3 & Evap
Very slowly deposits
Crystalline scales —
Gmelin —

Wea. WED. MARCH 29, 1905 Ther.

Sesquisulphide Cobalt
graphitic laminae
Fellenberg (Pogg. Annalen
L 73,
2[d] igniting protoxide Co
with sulphur & an alkali

Potassium Cobaltic Oxalate
mixing $Co(OH)_3$ K oxalate & oxalic
in water to thick paste & allow
mix remain 21 days black
laminae —
Kehrman (Ber, 19 3101 —)

Wea. THUR. MARCH 30, 1905 Ther.

Octamine Cobalt Salts
the sulphate crystallizes
in small scales
Amer J Sci [3] VI 116 126

Cobaltoctamine Salts
Iodide. $Co_2[NH_3]_8 I_2$
$[SO_4]_2$ Brown scales
Ba Salt yellow scales
Vortmann & Blasberg (Ber
22 2648]

Wea. FRI. MARCH 31, 1905 Ther.

In reducing Cobalt by
Zinc part of trace of
Easily reducible Metal
Copper — Chl Plat, 131
Lecoq de Boisbdn says cp
Zinc dont reduce Co except
in presence of Easily red
metal.

Chloropurpureo cobaltic
dichromate, Scales

Wea. SAT. APRIL 1, 1905 Ther.

Solutions of luteo Cobaltic
Salts. — Na pyrophosphate
added gives precip of
Leaflets insol H_2O or
NH_4 —
$3(12NH_3)\ Co_2O_3 + 5P_2O_5 + 40$ [illegible]

Try plating Zinc by Double
oxalates Double sulfate
Zn + NH_4 commixed large
Excess oxalic a of pp
formed its cleared by
adding NH_4 sulfate
Mix clean sol with NH_4
in slight excess heat
gently few minutes

Clean

Wea. SUN. APRIL 2, 1905 Ther.

[illegible] K Cobaltite
tablets —
CoO dropped into [illegible] pt.
molten KOH. Continue
heated for some time &
tablets of [illegible]
Cool & wash with H_2O
K Cobaltite insol water
decomposed at 200 C
H_2O then drives out K_2O
& Co_3O_4 remains

Wea. MON. APRIL 3, 1905 Ther.

Barium Cobaltite.
15 grms hydrated BaO_2
mixed with 6 grms finely
powdered BaO + fused
to red, just red. 1 grm
Cobalt peroxide added
in small portions.
Continue heat, after cooling
wash hot H_2O & finally
alcohol — Black
lamellae —

Ba Cobaltite with $BaCl_2$
Crystals form from mixed
salt in tables
(Weidsky? (Zeit f Chem
[2] VII 61

Wea. TUES. APRIL 4, 1905 Ther.

Sublimed arsenic forms a mirror on glass; porcelain etc. immerse these in Cobalt solution form arsenides then Reduce by H, Experiment

$CoCl_2$ adding aniline to an alcoholic solution of $CoCl_2$ rose red Leaflets looses all the alcohol of Crystallization

Wea. Briggs WED. APRIL 5, 1905 Ther.

Coe Mfg Co — 99 John St

Sheet Nickel

Crystalized phosphate of Cobalt

pour into solution $CoCl_2$ a sol of phos Na_2 in slight Excess. pp formed lilac color divide in 2 parts one dis in HCl avoiding Excess then add this to the other 1/2 & leave to itself after a time agglomerated Lamellae, beautiful Violet The Chemist 1856

Wea. THUR. APRIL 6, 1905 Ther.

5 20 pm

105 [illegible] miles

Elizabeth 6 pm

Rahway 6 28

Menlo 6 43

New Brunswick 7 05

Left 740

Wea. FRI. APRIL 7, 1905 Ther.

[illegible] 323 pm

Hightstown

840

Trenton

9~~2~~30

Left Trent 1033

Camden 930

Wea. SAT. APRIL 8, 1905 Ther.

Counter reads
211 — at Camden
~~320~~

130 pm
left Camden
Train
420

New Brunswick 555

Wea. SUN. APRIL 9, 1905 Ther.

109 - miles -

130 7~~3~~0 6 5h30

~~net~~ 1.30 . 730

11111 — 5h30 R

330.

5.5 / 109

6 / 109
18.16

Wea. MON. APRIL 10, 1905 Ther.

May 7 1905

Make some [illegible] [illegible]

[illegible] [illegible] [illegible]

[illegible]

[illegible] Ni 70% Bismuth 30

" Ni 70% Copper 30

Co 50% " 50%

Fe 50 " 50

Nitrate the Fe Cu —

[illegible] [illegible] sulphurize

Co " "

Cu

Make some [illegible] Co

also Ni flake

& sulphurize [illegible]

H2S for [illegible] [illegible]

Wea. TUES. APRIL 11, 1905 Ther.

Start full size drum

for plating —

also Elec furnace to

make anodes for it.

Fred Ott take apart

one of the worst [illegible]

big Cell [illegible] [illegible]

on long charges —

Remove the nickel

plates & try various

Expmts —

Carnauba

Makeshave C Soc Jul

22 1887 —

Allen . 12 ed 3 [illegible]

Sci [illegible]

Wea. WED. APRIL 12, 1905 Ther.

1 – Hydrocarbon mp 59
2 An alcohol $C_{29}H_{53}$ CH_2OH mp 85.5
3 Myricyl alcohol $C_{29}H_{59}$ CH_2OH,
mp [illegible]
4 – a Divalent alcohol $C_{23}H_{46}$ $(CH_2OH)_2$
mp 103.5
5 an acid $C_{23}H_{47}$ COOH, mp ~~77~~
72.5. Isomeric with
Lignoceric acid.
6 an acid $C_{26}H_{53}$ COOH. mp 79
identical or isomeric with
Carnaubic acid)

Stürcke
(A 223 314

See Gérard BS [3] 9 41
[illegible] Cd 7 87 [illegible]
[illegible] A. 183 344

Wea. THUR. APRIL 13, 1905 Ther.

Ralph O.

Sample 4 1/10 1% Ni + Co
Parry Sound 1. .24 of 1% "

To soak Cups in Ridgway a/c

Chloride Tin fresh – Hot
Aldehyde –
NH Sulphide –
Ferrous Sulphate Hot
KOH + Pyrogallic a
Cerium Monosulphate
Hypophosphite

also Mercuric Chl in Alcohol
Ferric Chl "
NH4 [illegible] in Alcohol
Ferrous Chl " Water

Wea. FRI. APRIL 14, 1905 Ther.

Left 5 45 am

449 miles

Huckleberry 915
miles,

491 — 42 miles

3 hours 30 min

Left

610 am

510 miles on Cyclom[eter]

8 am Huckleberry
[illegible] —

19 miles from Cement to H[uckleberry]

Wea. SAT. APRIL 15, 1905 Ther.

Nitrate Fe normal salt dis
metal in HNO_3 SG 1·29 [illegible]
taken up 10% add equal vol
nitric a SG 1·43 sol on
Cooling deposits salt, faint
Lavender blue.
This salt dissolves 2 5 6
8 12 & 24 molecules Ferric oxide
all sol in water

Neutral Oxalate Ammonia
dis Oxalate Ni - 2 of H_2O

Wea. TUES. APRIL 18, 1905 Ther.

Wea. WED. APRIL 19, 1905 Ther.

Cobalt ores -

Mineral Hill Maryland
in Chlorite slate with Copper
Cryst 25% Co

At Patapsco Mine near
Finksburg Cryst 1% Co
& at Springfield
Cryst 37% Co 1.5% Ni.
Called Carrollite.

At Chatham Conn, (Cobalt mine) as
Chloanthite (Chathamite)
occurs in Mica slate
with Arsenopyrite & Niccolite.
Co Variable from 3% to 20%

Danaite, is name of
Cobaltiferous Arsenical
pyrites or Mispickel
found at Franconia NH in
gneiss associated with
Chalcopyrite

Wea. THUR. APRIL 20, 1905 Ther.

Cobalt

Wea. FRI. APRIL 21, 1905 Ther.

also at Jackson &
Haverhill NH.

Reddish Dolomites
Contain Cobalt, sometimes
2% Co —

Some Carbonate Manganese
has Co, amounting to 2.4% Co

Bibb Co, Centreville, Alabama
Cobalt,

Wad - Manganese -
Cobalt found - near
Silver Bluff South Carolina
24% Co oxide 76%
MnO.

Wea. SAT. APRIL 22, 1905 Ther.

Wea. SUN. APRIL 23, 1905 Ther.

Remingtonite, Carbonate Cobalt, occurs as a coating on thin veins of Serpentine which traverse hornblende & Epidote at Copper mine near Finksburg Carroll Co Maryland

Khetri Mines, Rajputana India, Cobalt ores – (Jeypoorite) Jaipurite) – Records Geol Survey India XIV pt 2 199 1881 – The minerals are Cobaltite & Danaite,

Cobalt occurs in Coal in the ash –

Wea. MON. APRIL 24, 1905 Ther.

[illegible] 0.77 –
[illegible] ore
[illegible] ore [illegible]
18.51 Cobalt [illegible]
[illegible]

[illegible] Talley [illegible]
Co_2O_3 [illegible] gangue [illegible]

[illegible]
[illegible] 332 – Co_2O_3 0.240
Copper 0.761
Manganese [illegible]

[illegible] Chatham Conn
[illegible]
in Mica slate [illegible]
[illegible]
[illegible]
gangue Hornblende &
[illegible]

Wea. TUES. APRIL 25, 1905 Ther.

2 miles from Ballow 1822
Sand [illegible]
alluvial soil –
[illegible] hard ferruginous
sand the sand is
cemented together by
Cobalt & Manganese
Color black inclining
to blue, stalactitic.

In a manganese ore
from Virginia Co is
formed
[illegible]
[illegible]

Wea. WED. APRIL 26, 1905 Ther.

[illegible] Silver Harbor [illegible]
on west side Thunder Bay
Canada [illegible]
property silver & Niccolite
& some Cobalt, in Huronian
[illegible]
Vein [illegible] Bismuth
[illegible] 2 ft wide.

Co + Ni at Jackfish Lake
at Shebandowan
ore containing the Co + Ni came
from Heron Bay where there is
a promising vein carrying 9 to 10
% Ni + Co – $140 in silver.

Ni + Co have been found in the
Manganese gossans
of ~~[illegible]~~ [illegible] in Gaston Co.

Wea. THUR. APRIL 27, 1905 Ther.

Penna Survey V of Chem anal
p. 194. Iron ore opening near
Saltillo Cromwell Township on North W slope
of Jack's Mountain –
Botryoidal –
25% Proto Fe 27 from a Brown
Hematite
Co_2O_3 0.580

Blair Co p. 197 McCreath Rep
Chem anal
Co_2O_3 0.116 Baker ore Bank

p 209 – Chestnut Hill mines
Co_2O_3 0.165 .130 . 047 . 066

p 213 Trenton RR Co mine Trenton
Oxide Cobalt. 0.390
has some perox Mn

Wea. FRI. APRIL 28, 1905 Ther.

p 218 Saucon Iron Co mine
$O.140$ Co_2O_3

p 371 Cellular Quarry
Co_2O_3 0.170

Smuggler Val McCreath
Pa Geol S analyses
p 1 = Franklin Co -
Richmond furnace mine -
Co_2O_3 0.390. Mt Pleasant
Beaver 0.130
Co_2O_3 200.

Page 2 Carrick furnace wash
ore Co_2O_3 .280

Railroad bank. .280

Page 3 = Geo Weinmann Mine
Co_2O_3 .390

Wea. SAT. APRIL 29, 1905 Ther.

p 4 - Webster mine
Co_2O_3 0.510

Stinger mine, 0.390

Garlic bank mine 0.120

McCleary .180 Geo Rock
0.130 Pine Orchard .190

p 6 = Mill bank
Co_2O_3 .240

p 7 = Mont Alto Iron Co
mine 3 Co_2O_3 .250
~~4~~ 5 " .250
.220
8 .370

Nearly every mine in Franklin
Co got Co_2O_3

Wea. SUN. APRIL 30, 1905 Ther.

p 14 Means mine
Co_2O_3 .570

p 15
John H Cressler Co_2O_3 .420

p 18 South Mountain Mining & Iron Co
Laurel No 1 - Co_2O_3 .520

P 26 York Co -
Shelly & Hoffer Co_2O_3 .334
Logan .766 ?? of Sulphide
Cobalt,

Most of the Wad or bog
Manganese of the Limonite
~~Bog~~ Ores of Northampton
Lehigh Berks & Montgomery
& other Cos contain Cobalt

Wea. MON. MAY 1, 1905 Ther.

A large deposit of an
Ochreous Cobaltiferous
Variety occurs according
to Prof Roepper [private Com]
near Allentown Lehigh
Co at the mine of the Phila
& Reading Coal Co.

A Cobaltiferous wad
containing according to
Theo D Rand 10% of
Cobalt has been
observed by him in
the lower stratum
of the Drift opposite
Fairmount West Phila.

Wea. ~~Tues. May 2, 1905~~ Ther.

~~At Cornwall [illegible]~~

~~in the~~ Cobaltiferous Wad
in Williams Township
Northampton Co

Wad at Cornwall Lebanon Co

Cobalt is found at the
Mine LaMotte - an old
Copper mines in Madison Co
Missouri & also at the
St Joseph Mines Mo

Wea. Wed. May 3, 1905 Ther.

April 27 1906

Continued from other book

Dyer new rolls patent idea of
bringing up pressure to 16000 lb
Cracking point of Cement,

Patent Method of separating the
Iron Co, by reducing their
mixed oxides & dissolving out
the Ni by KCy & Recovering
the same —

See if I patented Iron process
of grinding up mixed sulphides
Fe & Cu & Igniting them
separately, to ~~dst~~ make porous
& anhydrous & then
oxidize thoroughly by roast
then reduce by H,

Wea. THUR. MAY 4, 1905 Ther.

Iron nug new process
15 ~~20~~ 25 ~~30~~ 40 % Cu
with 8 Hg each for 25 + 40%
Reg for 15% —

Keep all the mod groups
above 950 —
also same + vary the mixing
group with CP powdered
Ig Cu —

Group heavier range
ore — twice as heavy
+ 50% heavier —

Wea. FRI. MAY 5, 1905 Ther.

Some device measure
out each mixament
of 50 Tramps so all
alike —

Make several groups
with Nickel flake
Ni on Copper — dissolve out
by air + ammonia + a salt
the Cu + Copper —
also passing HS thro acid sol
containing threaded Cu Ni
sheets — dis CuS by ferric salts
or Copper Chloride —
can use the 1st Coat or
drum of Co + reduce Cu
with it to stop sticking
use same thickness
Ni flake as Co now
used —

Wea. SAT. MAY 6, 1905 Ther.

Ferric sulfate also metallic

Sulfate Cu in acid sol
attacks Metallic Cu
being reduced to Cuprous
Sulfate & air oxidizes it
back to Cupric Sulfate.

Copper immersed in Cupric
Sulfate saturated with
ammonia Cu dissolves
until all the Cupric Sulfate
is reduced to Cuprous Sulfate
Sol should be diluted with
deaerated water & closed
up —

Very Conc Monosulfide K
attacks Copper in presence air
forming Cupric Sulfide this
decomposes into Cuprous
sulfide & sulphur. then it
forms a double sulphide
of Cu & K sol in the solution
The action 1st formation KOH &
Cupric Sulfide. then as fast

Wea. SUN. MAY 7, 1905 Ther.

as formed splits up into
Cuprous sulfide which
forms the double salt
K_2S & Cu_2S & the sulphur
which forms polysulfides
Chem Soc Jnl 963
No 46 1884 —

Treat flake by KS fully
then oxidize the CuS
by K permanganate in
alkali. also by H_2O_2
Hypo etc to form sulfate.

Cu Sulfide Combines with
Na Hydrosulphide to
form Double salt sol
in Na S NaOH,
355 Chem Soc Jnl No 52

Wea. MON. MAY 8, 1905 Ther.

CuS dis easily in alkaline thiomolybdates forming Cupric thiomolybdate on adding HCl is precipitated unchanged

CuS dissolves ammon Thiomolyb

CuS forms sol double salts with Thio stannates Thiotungstates

~~[illegible] acid~~

~~[illegible]~~

Hyposulphite Soda dis Cu metal The Thiosulphate Copper can then be precip by Na Sulfide which regenerates the Thiosulfate of Na Solvent action is due to production of a double salt

---

Wea. TUES. MAY 9, 1905 Ther.

1 Litre containing 20 grms of Thiosulfate Na dissolving 100 mlg. Copper but can be continuously run through a Cu precip by KS & then regenerated —

Try McCaffuka in acetylene makes Cu acetylide. ?

Hyacinth from 7t Hygro-Dried

Ash 13.8 %.

2.55 Ammonia

0.41 phosphoric acid

0.70 Potash -

Wea. WED. MAY 10, 1905 Ther.

Cobalt in ad Lincoln
& Gaston Cos NC
Prof A Wurtz
Amer Journal Science
XXVII p 24 to 31

Rogers to make some
strips with more open (?)
larger perforations so
Can use .004 to .004½
or .005 stock for
tubes —

will
Morris be at Post Office
Thurs 17th or 18 May

Wea. THUR. MAY 11, 1905 Ther.

Gaston & Lincoln Co NC – Wurtz.

Talcose & Quartzite shists crosses
south fork Catawba River a little
south of line between Lincoln & Gaston
Cos in vicinity of the Falls called
"High Shoals of the Catawba"
This belt many miles long. direction
N. 20° E varying in places due N
& N 35° E at High Shoals its 3 or 4
miles wide everywhere traversed by
veins quartz carrying pyrities
& other sulphides showing on surface
Limonite Gossan Veins all kinds
strike & dip, most important ones
conform to general strike, dips
generally vertical
Proceeding Northwestward from
High Shoals into Lincoln Co along
belt of Talcose & Quartzose Shists
many places seen where Gold mines
Shuford & Canaler mines many
miles in distance but apparently
same range, high elevated in the
Graham Ore bank, fragments

Wea. FRI. MAY 12, 1905 Ther.

Wea. SAT. MAY 13, 1905 Ther.

of Limonite Gossan & honeycombed
Quartz constantly seen on surface
sometimes isolated & sometimes
strewn along considerable
distances marking outcrops
In this part of the range the quartz
veins usually contain whenever
opened more or less Galena
Blende & Chalcopyrite usually
with Native gold & in one place
rutile
Going southwestwardly from the
river we find the rocks presenting
similar indications & in course of
some 15 miles we encounter
successively the Long Creek gold
Mines from the Ashbury shaft
of which much gold has been
taken & a number of places
where Iron ore is or has been
mined Known a Costner
Ore bank Allison Ore bank
Ormond ore bank Ferguson
Ore bank Briggs Ore bank

Wea. SUN. MAY 14, 1905 Ther.

Wea. MON. MAY 15, 1905 Ther.

a few miles beyond the latter
not far from the same range lies
the well known King's Mountain
Gold mine so called Greenstone
trap dykes are occassionally
Encountered running parallel &
sometimes across the strata
The beds of the streams frequently
contain pebbles of Black
Tourmaline & black sand
Immense veins or rather Strata
of Black Tourmaline seen in
several places usually veined
with white quartz veins of
pyrites found crossing streams
where current washed bare
other places solid banks of
Limonite found standing
above ground —

At Allison & Costner ore banks
which are Excavated in Strata
of ore 30 to 40 ft wide, the waste
material was a true
Magnetite Shist mixed with

Wea. TUES. MAY 16, 1905 Ther.

Wea. WED. MAY 17, 1905 Ther.

much Limonite

Throughout the whole range wherever Examined;; The Talcose shists were found to contain in numerous places small seams incrustations & stains of a black substance which gave blowpipe reaction for Cobalt.

At all the mines the ore was coated more or less with this black substance at Ormond Ore Bank Especially

At Asbury shaft of the Long Creek mine masses of quartz thrown out of mine were thickly incrusted with many thin masses of this Wad or Earthy Cobalt

It cannot be doubted but that its the Gossan of some Cobaltiferous Sulphide as no arsenic was detected

Wea. THUR. MAY 18, 1905 Ther.

Wea. FRI. MAY 19, 1905 Ther.

It is soft unlike Earthy manganese smears the fingers & can be cut with a Knife - Exhibiting in sections the lustre of Compact grafite. The Country people call it Black Lead

A spot about a mile in Northeasterly direction from the Long Creek Mines I found crossing at right angles the road from Lincolnton to Yorkville in South Carolina where the later crosses over an Elevation called "Cross" or the "Paysour Mountain". The outcrop of a large vein or stratum of rock which contains very much of this black gossan or Wad It cannot escape the attention of a person travelling along the road as it appears like a broad black band on the side of the latter

Wea. SAT. MAY 20, 1905 Ther.

Wea. SUN. MAY 21, 1905 Ther.

at this spot it is 15 ft wide
a small opening was made in
it 3 or 4 rods from the road
on the southern side & found to be
12 ft wide included between
walls of Talcose slates.
It was traced & opened again
1/2 mile southwestwardly
from the road & found to
consist there of a number
of parallell strata separated
by seams of talcose shists
one or two feet wide the
largest of these strata was
10 ft wide presenting a solid
bank of Limonite mixed with a
little quartz & so compact
that it was difficult to break
with a pick

Following the Yorkville road
southerly from the point
where the vein crosses it
is found interstratified
with talcose shists Itacolumite

Wea. MON. MAY 22, 1905 Ther.

Wea. TUES. MAY 23, 1905 Ther.

following the vein northwardly
from the road the outcrop was
found to descend rapidly along
the western slope of Cross
Mountain & at about 1/4 mile
from the road was found a
spot where the ground consisted
in great part of fragments of
Black Cobaltiferous Wad like
substance Opening made
here would probably lead to
interesting & valuable developments
A Determination of the
Quantity of Mixed Oxides of
Cobalt & Nickel contained
in the Wad at this spot
gave 13 percent

The Cross Mountain Gossan
was found by qualitative
analysis to contain in
addition to Co & Ni
Mn Fe Cu Bi Zn Ca Al Mg Silica

Wea. WED. MAY 24, 1905 Ther.

Wea. THUR. MAY 25, 1905 Ther.

Mineral from the Ashbury shaft gave Fe Mn Co Ni Cu Bi Zn Al Si Ca Mg & traces Tellurium —

The substance from Ormond ore bank may be called Coballiferous Earthy Mangan or granular & Amorphous Hausmannite gave with HCl deep black or brown Solution — The Ashbury Shaft & Cross Mountain minerals gave deep grass green solution becoming yellow when diluted which is characteristic when much Cobalt is present

He thinks if these veins are opened down to unweathered Zone strike Sulphides Containing Siegenite a Sulphide of Co & Ni & in quantity

Wea. FRI. MAY 26, 1905 Ther.

Wea. SAT. MAY 27, 1905 Ther.

This mineral is found at
Mineral Hill Maryland —

Massive Manganese garnet ??
found at High Shoals Gaston Co

Some developement in Nickel
Mines at ~~[illegible]~~ Hemlock Floyd
Co Virginia —
Arsenic Mines near Rewald
Post Ofs Floyd Co Va

Madison Co NC near warm
springs belt 8 miles long
1 to 3 miles wide —
Light blue Manganese ore

Caldwell Co NC 5 miles
west of Lenoir, also
Perkins Mine, 10 miles
West of Lenoir
also 10 miles North of
Dobson in Surrey Co

Wea. SUN. MAY 28, 1905 Ther.

Wea. MON. MAY 29, 1905 Ther.

Noted locality for Serpentine occurs in Wake Co NC

also at near Asheville in Forsythe in Macon Co Jackson, Yancey Polk Mitchell Cos
finest beds are near Patterson Caldwell Co NC

~~[illegible]~~ Wad occurs near Murphy Cherokee Co also near Franklin Macon Co & Webster in Jackson Co

Large veins of Compact pyrites occur in Gaston Co NC

Mispickel found in Ashbury Gold mine Gaston occurs near Cooker Gap ~~Ward~~ Watauga Co NC in fine crystaline particles disseminated through schistose Rock

Wea. TUES. MAY 30, 1905 Ther.

Wea. WED. MAY 31, 1905 Ther.

also 1/2 mile W Blue Ridge gap
in Mitchell C 2 to 4 ft thick
Earthy — also in Nash Co
Jackson Co Chatham Co

in South Carolina
at Dorn Lands near
McCormick —

Noticeable locality of Mn
near old forge on
Crowders Creek on West
bank Crowders Mountain

Silver Bluff SC occurs on
surface of Coarse gravel
~~as its free from arsenic~~
has 35% CoO oxide
65% MnO_2

Wea. THUR. JUNE 1, 1905 Ther.

Wea. FRI. JUNE 2, 1905 Ther.

Vein of Psilomelane in Caldwell
Co NC 5 miles W of
Lenoir Embedded in
Gneissic Slates 3 or 4 ft wide

Small seam in town of
Danbury Stokes Co NC

Bed Mangan Garnets
are commonly of great
thickness there are a
series of beds associated
with Kings Mountain
slates at Gaston Lincoln
& Catawba Co's NC
Si 48 MnO 12.8 MnO_2 5.6
Al+Fe 30.44
Blue Limestones found
in King Mountain
slates interstratified

Wea. SAT. JUNE 3, 1905 Ther.

Wea. SUN. JUNE 4, 1905 Ther.

Mangan is found in Greenup Co Ky Ky — Serpentine or rather peridotites found in Elliot Co Ky

Oxide Co occurs on Brown Hematite or from Chester Ridge 3/4 mile West of Chester Furnace Huntingdon Co Penna Surface of ore in places covered with thin layers Cobalt oxide fullacot Proc Amer Phil Soc Jany 1846 IV 239

Wea. MON. JUNE 5, 1905 Ther.

Iron ores of Shenandoah Valley
many miles show following
general analyses —
~~Fe~~ Fe_2O_3 %
Cobalt Co_2O_3 — .130 — to none
The .130 is from Fox
Mountain Bank Shenandoah
[illegible] Co Rockingham Co
These ores are in Potsdam
primal formation, MgCa
Potsdam Slate —
along some [illegible] in [illegible]
is Manganese ores The
Crimora for instance
Crimora has .354 Co_2O_3

Largest deposit of [illegible]
for Sulfuric acid is in
Carroll Co Va
20 miles long

Wea. TUES. JUNE 6, 1905 Ther.

Rufus
17th & Penna
ave.
J G Reinhardt
Union Sta [illegible]
~~near his place in the [illegible] Street~~

W A Mauney
Kings Mt Village

Posted about the Country

[illegible]
Payson [illegible]
1 6039 7/8
1st 6046 5/8 Sample

Wea. WED. JUNE 7, 1905 Ther.

2nd Sample 2 miles
the wide [illegible] along
side road

Wea. THUR. JUNE 8, 1905 Ther.

Working Arsenical Co ores

Roast, dissolve HCl, add Bleach
this raises Arsenious to Arsenic
except [illegible] dissolve Keep it
acid [illegible] completely out
Co & Ni Chlorides — Conc Soln

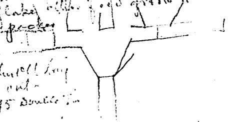
Dissolve ore in H_2SO_4 add Bleach
Keep SO_4 in excess, all Co will
formed $CaSO_4$ [illegible]
& Evap to completely Keep
solution [illegible] with free
HCl, any undissolved
residue Removed, Conc Soln
instead Lime Chloride use
Hypoflu—

Make tubes thin Co flake ~~[illegible]~~
also thicker .75 double Lamps.
all Ni tubes 6 of each—
with & without alcohol washing
4 rings.

Reg Co flake 6 tubes 4 rings each
3 rings on before pkg 3 after pkg

Wea. FRI. JUNE 9, 1905 Ther.

Feed other way two plungers feed
flakes either feed screw to
pocket



Tubes all long
end -
75 double

6 tubes Ni —

Get 30 gallon still deep
for preparing drawn Vacuum
pump - make stuff for
moulding records -

3 Iron tubes charge soak
water + alcohol press out
+ put oval rings on

Wea. SAT. JUNE 10, 1905 Ther.

Nickel flake —

Hyposulfite soda 20 grm
to liter dissolves 100 mlg
Metallic Copper — They can
be precip by Na Sulfide
which regenerates the
Hyposulfite. its solvent
action due to formation
of double salt, can make
a continuous system this
way which allowed works
with Zellar Co or Ni
flake made by Copper
process

Dyer attend vers Rolls

New water jacket dust
depositor -

Wea. SUN. JUNE 11, 1905 Ther.

gauge to Ni plate 1/2 thou
less ~~13 thou~~ good
ditto 7 thou ditto 5 thou
75" Double T — 4 rings
Ni tubes, 1/2 of each 6
rings before other half
rings after plating —

Plate some 1/0 strips with Ni
wash in thin H. Cut to
flake make to tubes
75 DT — 4 rings 3 after
& 3 before plating —

Heater changes new Sprengel
Double blowers for Kelm

Wea. MON. JUNE 12, 1905 Ther.

Wea. TUES. JUNE 13, 1905 Ther.

Wea. WED. JUNE 14, 1905 Ther.

New tubes

1411 Tamp rod 15/1000 less 6.575

1412

1413
1414 Tamp rod 30/1000 less

1415
1416 Tamp rod 60/1000 –

1436
7  –

1442-3 — Hole Drilled thru Center

1444-5 burs filled so Twice as much open
6.602

1446-7 – more filed off old sq clock
6.569 – 7.377 –

1448-9 – Spiral tubes 4 rings
6.820.

1450-1 – Spiral tubes no rings

1452-3 2400 perf burs 1/2 filed off
6.200

1454-5 2400 – burs all filed off –
6.100 –

1456-7 Rogers No 1 perf
6.300

Wea. THUR. JUNE 15, 1905 Ther.

1458-9- Rogers No 2 perf-
6 1 2.00

1460-1- Rogers 1 perf- both [illegible] at once
6 400

1462-3 Rogers No 2 perf "
6 400

1464-5-6 - Rogers 2400 [illegible] -
Reg plunger 60/[illegible] style one
flake [illegible] green open

1467-8-9 Rogers 2400 [illegible]
style 2 flake green [illegible]

1470-1-2 Reg plunger No 1 style - Rogers 2400

1473-4-5 Dup of 1470 - No 2 style -

1476-7-8 Dup 1470 No 3 style
flake all open before green

1479-80-81 - Rogers 2400 - 60/1000 less
than Reg plunger Nickel flake -
Style 1 -

1482-3-4- Dup of 1479
Except Style No 2 Ni flake

Wea. FRI. JUNE 16, 1905 Ther.

1485 Rogers 2400 - Reg plunger
Ni flake Style 1

1488-9-1490 - Dup of 1485 No 2 style Ni

1491-2-3 Dup 1485 except 3 Style Ni

1494-5-6 - Co - green 1 wash before
[illegible] - No 1 style - 7,700

1497-8-9 Dup of 1494 - No 2 style - Rogers 2400
7, 8

1500-1-2 2 washings green Rogers Co
2400 - No 1 Style

1503-4-5 Dup 1500 - No 2 style Co

1506-7-8 - 3 washings - Rogers 2400
Reg plunger - No 1 Style Co flake

1509-10-11 - Dup of 1506 -
Except Style No 2

Wea. SAT. JUNE 17, 1905 Ther.

1512-13-14 — Regen 2400 burn ground
Style 1 — to be charged 10 hours
rest 10 hours chg 10 rest 10
chgd 10 then discharged [illegible]
run reg thereafter

1515-16-17 Dup 1512 but
style 2 =

1518 (18+20) Regen 2400 burn off —
10 ~~Nickel~~ Co flake —
24 green thro 40 mesh fine
[illegible] — Reg plunger
Style 1

1521-2-3 — Dup 1518
but style 2

1524-5-6 — Regen 2400 burn off —
10 Co 24 green thro 60 mesh
Style 1

1527-8-9 Dup 1524
Style No 2

Wea. SUN. JUNE 18, 1905 Ther.

1530-1-2 Co — 10 — green 21
chloride K 3 — thro 100 mesh
green & KCl mixed —
Style 1 —

1533-4-5 Dup of 1530 —
Except mix flake in KCl to get them
100 pts flake 30 pts KCl —
Style No 1

1536 — Regen 2400 burn off —
3.3 Ni flake 5 green thro 20 —
style 1 3 sections then tamp —

1539-40-1 — Regen 2400 burn off
5 flake 12 green — 2 sections
[illegible] in Style 1 then tamp —

1542 — ditto —
5 Ni flake 12 green put in 3
sections style 1 then tamp —
1545-6-7 Dup 1542 Except 4 sec
then tamp —

Wea. MON. JUNE 19, 1905 Ther.

1548-9-50 — Dup 1545
Except part in 6 sections thin
lamp — style 1 —

1551-2-3 Dup 1530 — Rogers
10 Ni flake 19 green & 20 f both
mixed Reg plunger

1554-5-6  new sectional Tamp
10 Ni flake 24 green — Rogers

1557-8 — 2 flat pkts ohg 3 in deep
seen — Rogers

1559-60-61 — Rogers
10 Ni half thickness
24 green — Style 1 —

1562-3-4 — Dup 1559
Style 2 —

Wea. TUES. JUNE 20, 1905 Ther.

1565-6-7-8 — flat pkt —
4.5 % Vanadium free —

1569-70-1 —
10 Ni 24 g — Rubber check plunger
Style 1

1572 — Rogers 2400 —
10 Ni thrott — 24 g Style 1

1575-6-7 10 Ni 1/2 thick —
thrott — 24 green Style 1 —

1578-9-80 — Rogers — plunger
before smaller 10 Ni 24 green
Ni washed XXX many washings
style 1.

1581-2-3 Dup 1578 Style 2

1584-5-6 — Rogers 2400 —
Reg plunger chgd 10 next 10 chgd
... — Style 1 —

1587-8-9 Dup of 1584
Style 2

Wea. WED. JUNE 21, 1905 Ther.

1590-1-2 Repeat [illegible]
10 Ni 24 green flakes 60/1000
[illegible] chg 10 [illegible] 10 chg 10 [illegible]
[illegible]

1593 Dup 1590 - Dup [illegible]

1417-18 put on continuous chg
2 weeks

1401-2 Chgd reverse 2
weeks -

722-3-4 Reversed first
24 hours - or cold
then run reg - cold
tube - not washed free
glucose originally

Wea. THUR. JUNE 22, 1905 Ther.

1595-6-7 Dup of 1467
Run 33%

1598-9-1600 Dup 1467
Except Ni flakes
Run 33%

Wea. FRI. JUNE 23, 1905 Ther.

	4	5	6	7
1464 —	962	986	1010	1025
65	990	1005	1027	1045
66	1002	1020	1041	1060
67	1040	1045	1061	1087
68	1038	1045	1057	1075
69	1030	1032	1050	1063
1470	1020	1020	1037	1055
71	1025	1023	1042	1057
72	1025	1020	1037	1055
1473	1037	1015	1030	1045
74	1022	1017	1032	1047
75	1046	1047	1055	1070
1476	1007	1005	1020	1035
77	1028	1025	1040	1060
78	1023	1020	1035	1050
1494	948	1017	1047	1067
95	934	995	1025	1037
96	990	1065	1097	1107
97	980	1062	1090	1100
98	912	977	1010	1020
99	786	850	885	900
1500	1000	1012	1003	
1	1050	1062	1055	
2	1070	1087	1075	

Wea. SAT. JUNE 24, 1905 Ther.

	4	5	6	7
1503	1086	1100	1087	
04	1110	1125	1110	
05	1090	1107	1092	
1506	1070	1085	1070	
07	1072	1095	1080	
08	1062	1085	1071	
1509	1042	1052	1046	
10	1055	1070	1062	
11	1040	1055	1050	

Wea. TUES. JUNE 27, 1905 Ther.

group

Aug 2nd 1905

60/1000 less hole, $\frac{1}{16}$ th —

Dup some best groups with flat feed strip

Wea. WED. JUNE 28, 1905 Ther.

Wea. THUR. JUNE 29, 1905 Ther.

Wea. FRI. JUNE 30, 1905 Ther.

~~1 = John Ott design auto filler for new tube, the big machine to be an aggregate~~

2 = Establish test for economy on test pockets reg mix —

3 = Conduct economy tests on Ni mix made by varying the mixing

4 = Test economy of Vanadium free iron

5 = Group with silk mixed with flake

6 = Make Fe amalgam distill Hg off in vac — make amalgam electrolytically deposit in H_2O —

7 = Fe Electrodes with 20 33 4 50% copper — also others having same % but with 5% HgO —

8 Make Colloidal iron by iron rod under water KOH, by powerful current,

Wea. SAT. JULY 1, 1905 Ther.

9 = make iron by rapid deposition Electrolytically as black powder

10 = Make some Cobalt same way as we make iron, Oxalate + CP reduce by H2 test water in use as substitute of Fe.

11 Make iron by igniting Nitrate, also Nitrate K + Nitrate Fe

12 Fuse Sulfide Fe with K Nitrate

13 Fe pockets with Fe mesh iron Ni plated screen in iron pockets

14 = group tubes dry pkg using CP $Ca(OH)_2$

15 = plate Zinc on Magnesium plate from Zn KOH + Silicate K —

16 = Group test with dry pkg Change 10 test [illegible] Ele with 4 lbs — $4\frac{1}{2}$ & 5 lb drop 15 sections —

Wea. SUN. JULY 2, 1905 Ther.

17 With good group find best point of Contact dry & see if it is 70%

18 Makesome [illegible] of Fe [illegible] + form FeO in KOH by Electrolysis

19 Ralph try heating the iron by boiling water + [illegible] to prevent forming triple oxide

20 Pack tube with [illegible] mesh FeS 7+3 Ni flake + alternate also [illegible] Bisulfide Fe also FeS + HgO — Bisulfide Magnet swell + [illegible]

21 Mix with Reg Fe very 10 20 + 30% Cadmium Hydroxide —

22 Make Cd hydroxide + Hg pocket. dill. ~~Hg~~ Cd metal reduced + Hg also anhydrous Cd + Hg test [illegible]

Wea. MON. JULY 3, 1905 Ther.

23 = Try Cobalt flake strips 20/1000 also 60/1000 wide & Cobalt flake [illegible] Ni

24 3 pockets with 7 & 5 + only reduce 5 by K [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]

25 ~~group with black hydrate Ni [illegible] [illegible] [illegible] with [illegible] [illegible] [illegible]~~ Chg 10 rest 10 [illegible] rest style [illegible]

26 [illegible] [illegible] 7 & 5 [illegible] [illegible] [illegible] K in KOH [illegible] [illegible] [illegible] [illegible]

27 Try regenerating old cells Chg 10 rest 149 [illegible] 40 hours chg —

Wea. TUES. JULY 4, 1905 Ther.

[illegible] new group [illegible] style [illegible] Chg 10 rest 10 chg 10 rest 10 Chg 5 rest 10 [illegible] 5 rest 10 — also Ni flake [illegible]

Dup of 28 [illegible] [illegible] [illegible] [illegible]

30 — [illegible] 28 [illegible], Cobalt Ni flake Cup

31 [illegible] dup. [illegible]

32 Tube packed with 7 + 3 [illegible] [illegible] [illegible] 20 [illegible] in Cobalt flake [illegible] [illegible] [illegible] KOH

33 — Inspect ~~battery~~ building

34 See Billy Bee

35 — ~~group with graphite pure nickel~~

Wea. WED. JULY 5, 1905 Ther.

36 Answer ad[illegible] Elec [illegible] for [illegible] Elec[illegible]

37 = Greenley to take up Catskill [illegible] w/ R

38 = 1 1/2 / [illegible] Nickel sheet for testing 7

39 = Find out Limestone Condition at Cement [illegible]

40 = See Condition Cobalt plant Silver [illegible] —

41 Ralph's having [illegible] with [illegible] Co —

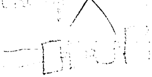
abrogast No. 6713 6714
with Hg given 1st run
1300 av

No 6699 6700
given 1766 — av
with Hg —

Wea. THUR. JULY 6, 1905 Ther.

Dyer — Have complete Volumes of English & German patents See [illegible] Battery

[illegible] patent new 12 G [illegible]



Notice

See Kell — [illegible] things go —

Vanadium free iron shrinks on 2nd run — Have Ralph make some non pyrophoric [illegible] if it aint good it wont be [illegible] them.

Wea. FRI. JULY 7, 1905 Ther.

[illegible] KOH is white not colorless of [illegible] O –

[illegible] make plate [illegible] by [illegible] [illegible] of Light – [illegible] plate –

also Fe [illegible] free Charge than discharge wash [illegible] dry & reform [illegible] –

Look at Curves of Fe where used Light – medium & heavy pressure [illegible] –

Wea. SAT. JULY 8, 1905 Ther.

Make some Fe plates like we do Copper Ox plates – Use Oxalate Iron – mix with KOH – press & heat also moulded with grid in center (1e) piece of perforated 1.05 ~~steel~~ Iron

Test Economy on Fe pockets 3 g [illegible] 4.5 & 6 grams –

Test Co plated tubes with Fe – Economy

Wea. SUN. JULY 9, 1905 Ther.

grains the
old Reg glucose
mix but new square
fed 150 sections —
thru 60 & thru 40

---

plate Ni Fe Ni Fe
1/10000 — then cut up
.005 squares —
make a tube —
or pocket —
~~little Cu~~ — flake
Cu Fe —

Wea. MON. JULY 10, 1905 Ther.

Make phosphate
Iron in stick
& reduce by
Current ckt of
Coherent.

Melt oxide iron
pickle —
also mix of 75 FeO
+ 25 pts NiO —
melted together

Wea. TUES. JULY 11, 1905 Ther.

Run cat Ni flake
00010 thro H—
it seems be better

Melt Ferrous Ox
in plates, reduce
by H, self heat,
also with grid in

also melt nickle
oxide + press with
internal plate
Reduce by H,
self heat.

Wea. WED. JULY 12, 1905 Ther.

Dr Goethe [illegible] of [illegible]
Ag in last rather
Qualtite from
Wilson —

Melt some CuO
in Oxygen seal
Vallage [illegible]

Try Reg [illegible]
Iron pocket not
Ni plated —

Wea. THUR. JULY 13, 1905 Ther.

Precipitate Fe_2O_3 [illegible]
by Ammonia wash
[illegible] dry then
moisten electrolyte +
press in [illegible]
+ test in pkt
also wet with KOH
+ ignite to Coke [illegible]
+ test

Try no binder for
Ferric from oxalate
Moist ferric hydrate
ignite + Reduce by H.

Wea. FRI. JULY 14, 1905 Ther.

When new machine OK get 1060

~~group 500 miles KCl~~
~~" 1000 "~~
~~2000 "~~
~~4000 "~~
~~10000 "~~
~~Economy etc - tests~~

After machine for Tamping
is OK & can make tubes
Every time around 1050

Put group 5 up with
Cu Hg Trans Reverse
twice every 50 Runs
Co flake —
Ditto Ni flake thro H

Wea. SAT. JULY 15, 1905 Ther.

Moulds around a spread with burr. Fe alone ferric from oxalate reduce by H. — Water — Vanadium Tungsten free

ditto but bring to non pyro state, —

~~ditto~~

Take ferric Va + W free mix sulfate Fe to equal 30% of the iron — Magnetite + reduce by H Regular way and heat, No Hg —

Wea. SUN. JULY 16, 1905 Ther.

Reduce oxalate Fe by H — to get greater porosity —

Test running Reg Fe

1 gr — pkt 2 gr

$2\frac{1}{2}$ 3 3.5 4

4.5 5 6 7 10 —

get a Curve Reg pkt

Wea. MON. JULY 17, 1905 Ther.

If plate iron has
Contact in Centre
Then the last part to
reduce will be the
outside & be easier
therefore better economy

Above ought be
good for Lalande's
plates —

Test economy (expense)
CuO in OX —
Lalande —

Wea. TUES. JULY 18, 1905 Ther.

Test Fe cell with non
pyrophoric plate
previously prepared then
reduced grid inside

Test Hot to get it oxidize
quicker — Va + WO free

another one charge
Hot 40 hours —
WO + Va free —

Tell Dr Gualke that
something in Fe that
makes what Low when
non pyrophoric —

Wea. WED. JULY 19, 1905 Ther.

Rogers make some
005 Stock 2400 -
Eyelet

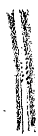
Rogers also make
some with say 200
but run across stock
to give strength to
tube 005

Wea. THUR. JULY 20, 1905 Ther.

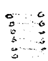
72 pocket charge it fully
40 hours
take out put in water
Soak couple hours
Let it self heat fully
Recharge & test,
then recharge again
& self heat again
& Recharge & test

Take tubes out of old
plates sent over by
Rogers 240 almost
pass me.

Wea. FRI. JULY 21, 1905 Ther.



put line 1/32
outside stem Fe
125 / [illegible]
packed —
split moulded
nothing on
outside long [illegible] tube
hollow pkg plunger



Spaced put in
inside pkg
[illegible]
packed & then taken out

Wea. SAT. JULY 22, 1905 Ther.

Put 2 changed irons
in Cup one outside
1 inside of porous
Cup & [illegible] porous Cup
put 33% & outside
21% [illegible] of dif of
Voltage

ditto Ni in 21 Fe
in 33% —
ditto Ni in 33 & Fe
in 21%

Wea. SUN. JULY 23, 1905 Ther.

Try Economy on Cutting
grains — See if Ralph
has any with higher
Copper —

Ferric oxide —
wet with Sulphate
Tungsten, then reduced
by H

Finely divided Tungsten
from Sulphide [illegible] and
[illegible]

Wea. MON. JULY 24, 1905 Ther.

see if Ralph uses
Distilled water to
cut heat of Fe

Try Economy with &
without [illegible]

ditto with
14% 20 25 33%
Copper + 4% Hg
increasing proportionally to Cu
increases —

Wea. TUES. JULY 25, 1905 Ther.

Try Economy [?] Fe
in 250 500 1 2
3 & 5 grms
Bromide K in KOH,
its Easier decomp
than KOH —
it showed big increase
before

Charge Nov/pyro[?]
Fe in KOH
at 1.75 [illegible]
see if [illegible] up to
capacity —

Wea. WED. JULY 26, 1905 Ther.

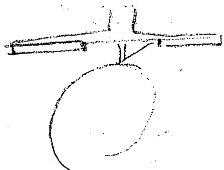
Try group 500
using Iodide K —
Ni also Co flake
Never tried it
with flake Co Ni

Alloy of Fe & Sodium
Melt Fe in Electric
arc & throw in
Clean Sodium to make
20 @ 30% alloy
put in [illegible]
allow it decompose
see if [illegible]

Wea. THUR. JULY 27, 1905 Ther.

Dyer another foreign
Cement patent —

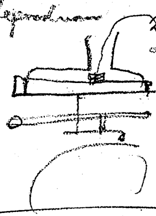
Walter Miller



Reg dia on a Cylinder
to a dia Twice as
large

Wea. FRI. JULY 28, 1905 Ther.

Reproducer



2nd dia
loaded
with lead

Ralph — make some
45% Cu 50% Zn
5% Hg —

Make 2 grids Each
10 atmos Smooth & Cov
40 ~~400~~ & 300 atmos

Wea. SAT. JULY 29, 1905 Ther.

Make lot of Fe Cakes from oxalate, heavy press also light press—use water. ignite to white. Soak various Copper salts, ignite some soak more than once & ignite— Test direct—also reduce some in H at various temperatures —

ditto in 1/2 Cups

some cakes reduced non pyro— then reoxydize in air slow heavy little fully red or long drying ditto Copper soaked

Wea. SUN. JULY 30, 1905 Ther.

~~Reverse water all low E18 possibly bring it back~~ 2 W Wks

10 days Rec

Dr to make Oxalate tungsten

~~Uranium~~ — 5

Molybdenum

~~Chromium~~

to be reduced in H & Hg & 50% Copper added before reduction.

test to see if ...

ditto Cadmium 50 Cu 50

6% Hg

Wea. MON. JULY 31, 1905 Ther.

Ralph - make some

Cu 60 Fe 40 — Cu 70 Fe 30

ditto with Hg 5%

also Fe 60 Cu 40

Fe 70 Cu 30

ditto with Hg -

got Cumms.

Take several old groups 3 os to 350

Rhm's Vital [illegible]

lost [illegible] 120

+ Reverse 1/2 [illegible]

1/2 2 [illegible]

Wea. TUES. AUG. 1, 1905 Ther.

Dip all the groups 3 to 5 lbs

Co also Ni -

+ chge 10 rest 10

etc -

ditto Hot,

ditto 1st remove

36 hours Hot

then chg 10 rest

10 etc - 1st week

Wea. WED. AUG. 2, 1905 Ther.

3 to 5 lbs groups
2nd washing

ditto 3rd washing

ditto Reg

Mix with Reg Mix
platinum —
ditto palladium
d

Wea. THUR. AUG. 3, 1905 Ther.

Charge & then
thoroly dischg ~~&~~
Pts. + Elements
KOH, by H_2O +
ethyl — then
soak in Chloride
Conc of any
metal to get
Catalyser

Wea. FRI. AUG. 4, 1905 Ther.

Catalyser showed be mixed with Copper + Copper Hg
[illegible] also -

possibly reduction takes place by K hence after [illegible] oxalate reduction difficult [illegible] metals - hence Oxalate should not be ignited but reduced by H - with 50% copper
[illegible]

Wea. SAT. AUG. 5, 1905 Ther.

probably double oxalate Fe + Cu

Try Double ox igniting + also reduce by H -

also burn oxalic by Chemical means -

possibly the gas voltage due to the [illegible] amalgam formed with the free Hg - possibly with 50 Cu 50 Fe no Hg - gas V disappear

Wea. SUN. AUG. 6, 1905 Ther.

sea chg Curve 72
5% 10 15 21
33%

Ferric fm Oxalate
wet with Tungsten
Chloride + Red by
H, also Tungsten
ammonia + sulph
+ Red by H +
also with Ca

Wea. MON. AUG. 7, 1905 Ther.

~~Hooper reverse,~~
~~2 weeks not the~~
~~very old tubes~~
~~discarded today~~

Walter Miller
Regulatable
valve in Recorder

Wea. TUES. AUG. 8, 1905 Ther.

XYZ — [illegible]

Expose all fluorescing crystals + Heusel light + acetylene etc to arc for [illegible] with all kinds of salts of all the metals —

Make salts of all the metals + then — put — the Reg plates plates 5x2 in photo —
Then make a list of
Every fluorescence — all substance — [illegible] — on the metal plates on the metal salts slides + photo
2 weeks or more [illegible] —

Wea. WED. AUG. 9, 1905 Ther.

~~Ferric oxalate in ~~[illegible]~~ violet [illegible] metallic Iron — solution Fe + Fe_2O_3 mixed, must be strongly heated —~~

Make some Cakes of ferric iron oxalate gypsum ~~Sodium~~ Sulphate Copper Ignite to yellow [illegible] and [illegible] again — 2 1 soak
2 2 soaks 2 3 soaks
Zinc Sol —

[illegible] Ferrous Chloride into red hot hydrogen
Save the HCl to use on fresh iron, continuous process — powder falls down into water jacketed tube —

Wea. THUR. AUG. 10, 1905 Ther.

Rig up to Change pair
now in 21% at
100 125 150 175 —
pair fresh ones for each
temp — use Nickels
of any results.

also charge with strip
in 21% KOH, pair now
at 125 150 175 212
& then put with fresh
chgd Nickels &
discharge and see
result,

Wea. FRI. AUG. 11, 1905 Ther.

before discarding a
group of moist
dischgd — ~~[illegible]~~
dry them at 350 Fahr
& re run —

also similarly set
[illegible] KOH
& dehydrate at 350
Idea used to say that
was dried in oven
after taking out of
battery then filled
them [illegible] — [illegible] due
to Hydrates Cementing &
then becoming active on discharge

Wea. SAT. AUG. 12, 1905 Ther.

Dr Goethe to find a
means of decomposing
Oxalate Fe at lowest
possible temp —
to get the O more attracted
to K or H on charge

also prepare ferric
ox by dry process
dehydrate ing dry process
to get the O most active
to reduction

Lord Rosse makes ferric by
precip $FeSO_4$ ferrous
dilute by ammonium
wash + press it in
cloth in hydraulic
Till nearly dry then dry it

Wea. SUN. AUG. 13, 1905 Ther.

at a heat very dull red in
dark.

Watts 395 Iron — says ferric
hydrate can be completely
dehydrated at 160 to
200 Cent. in a saturated
Sol of CaCl or NaCl,

Watts says ferric hydrate
dehydrated below
red heat,

Try some FeS
Roasted free S at
lowest temp —
also high temp of
powder before Roasting
200 mesh

Wea. MON. AUG. 14, 1905 Ther.

ditto from squirting
the Nickel —
also from squirting
Double Salts having
smallest quantity Fe
giving softer and better
results, Sol double
oxalate etc —
to get enormously
subdivided —
Try Tantalum etc —
ditto " " Nickel

Wea. TUES. AUG. 15, 1905 Ther.

Make pocket filled
with exceedingly
finely Copper solution
by Current Wash &
then fill with Ferric
hydrate scissor clamp
dehydrating each
time very hard
cramp —

J C Pfeiffer & Bro
Central Market
900 Bloomfield St
Hoboken —

Roast 10 lbs 180
Steak 3½ 35 680

Wea. WED. AUG. 16, 1905 Ther.

Pitch - Chatfield Mfg Co all Kind
Castings Ohio

Kopak No 30 used by
Raven [illegible] Mining Co
of Texas - an asphalt
Rubber [illegible]

Asphaltic Pitch made by
Waters-Pierce Oil Co
at their Texas plant

Asphalt = Gulf Refining
Co Port Arthur Texas

The Arthur C Harvey
Co - 375 Congress St
~~[illegible]~~ Importers Norway & Swedish
Irons - Big stock

Wea. THUR. AUG. 17, 1905 Ther.

Asphalt of Mr John McNeal
of Casper Wyoming

Wax Tailings from
Standard Oil C

Wheelock Lovejoy & Co
23 Cliff St NY
Importers ~~[illegible]~~ of
Swedish Norway
Iron

Horace T Potts & Co
Importers Swedish Iron

Wea. FRI. AUG. 18, 1905 Ther.

[illegible]
[illegible]
KCl [illegible] on [illegible]
[illegible]
with [illegible]
[illegible]

Mil [illegible] ——

group

2 gms [illegible]
2 " KCl } [illegible]
3 " Na [illegible]
2 " $NaCl$
[illegible]

Test tomorrow [illegible]

[illegible] with 4 grams
KCl [illegible]

Wea. SAT. AUG. 19, 1905 Ther.

[illegible]
4 grams KCl
2 " [illegible] K } one cell
[illegible]

Sodium Sulphite, or K Sulphate
white Crystal
4 grms to each cell —
[illegible]

[illegible] 2 KCl 2 [illegible] K or Na Sulphate
[illegible]

[illegible] heel [illegible]
[illegible] Cement
[illegible] —
[illegible]
[illegible] with Silica
[illegible] Tube [illegible] ground
with Cement [illegible]
[illegible]

Wea. SUN. AUG. 20, 1905 Ther.

[illegible]

Ozocerite.
Mr Kronpa
Provo City
Utah

Ask for Samples &
price. at RR -

Saturate Hg Electrically
with Iron - pass in
Chamois Hg out but
in pkts Keep press
[illegible]
get Ex[illegible] Hg out.

Wea. MON. AUG. 21, 1905 Ther.

ditto add - Cu
Cd - Co Ni & other
metals in dif proptns

Ethyl Sulphuric a.
$C_2H_5SO_3$ is the radical

Dif Double Salts,
of Alkalis,

[illegible] 21% methyl alcohol
Dissociating power 1/2 to
1/3 of water - Arrhenius

Wea. TUES. AUG. 22, 1905 Ther.

Change group in water with only 10 milgms KOH in Solution — Then before discharg put in 21% and before charg

another group Change in 21% soak in water 1/2 hour then put in fresh water & charging —

Wea. WED. AUG. 23, 1905 Ther.

~~Group with 2 gms acetone —~~

~~Group with tubes moistened by Capillarity by dipping ends in KOH & retain in closed jar 4 hours to completely fill with KOH & displace air —~~

Wea. THUR. AUG. 24, 1905 Ther.

Groups worked in
alcohol with Ethyl
then dried a boiling
boiling point
Ethyl [illegible]

Red ph. [illegible] [illegible]
[illegible] of CoP Cobalt
Reduced by H. [illegible]
metallic [illegible] [illegible]
[illegible] [illegible]
& Economy

Wea. FRI. AUG. 25, 1905 Ther.

Fe for economy
after Fe 1/2 charged
Soak in water 1/2 hour
& then proceed with
charging see if [illegible]
by diluting the KOH
forming in chg —
ditto Reverse of
this in chg —

Test economy of cell
in minimum KOH &
maximum [illegible]
[illegible] in large [illegible]
electrolyte

Wea. SAT. AUG. 26, 1905 Ther.

Prepare Hydroxides of
Ni ditto Fe by
using Ni as anode &
Ni as Cathode —
agitating liq
using NaSO4 —
or K nitrate or
NaCl — KNO3 gives
Fe_2O_3 Hyd & NaCl
of FeO Hydrox

Test running Fe pkt
in NaOH

Wea. SUN. AUG. 27, 1905 Ther.

also in 21% KOH
with 4 grms Rubidium
Hydroxide — as this forms
~~Hyperox~~

Realgar dissolves in
KOH Solid —
Wohynat ignite 200 mesh
Cocoanut with Sulphur
& KOH & dissolve out
Realgar —

Wea. MON. AUG. 28, 1905 Ther.

Reduce Mixed precipitate or ignited Nickle Sulf washed out by H to no pyrophoric state.

Mix { 30 Tin 70 Fe
" Sb 70 Fe
" Cu 70 Fe
" Bi
" Ni
" Co
" Cd
" Zn
"

also dip + add Hg to each 5% =

Or furnish Oxalate Cobalt to RA to reduce by H + sell it

Wea. TUES. AUG. 29, 1905 Ther.

Carb Soda to which S is added & fused with arsenide the metal remains as sulfide free from arsenic —

(possibly Charcoal coals should be added)

Plate Fe pockets with Cobalt instead Nickel —

Wea. WED. AUG. 30, 1905 Ther.

Charge 1/2 doz. 5 [illegible]
Reg mix Fe 0.4 day
Cadmium + then
put up to test for
Economy + Capac.

1 set did discharge
below Volt
another not below
1.2 Volts —
another to 30
another to [illegible]

Wea. THUR. AUG. 31, 1905 Ther.

Chg. 2 Reg [illegible] Each
2 days
4 "
6 "

Take Fe with
30% Cu 70 Fe + 5 H_2O
open after charge
1 after dischg

Holland find out
if big [illegible] or gas dischg
is [illegible] Fe or Ni

Wea FRI. SEPT. 1, 1905 Ther.

Dr Griffiths

Reg Fe mix with hydrate 2

Mix 40% Ce_2O_3 Hydroxide

dried - powder together — " 6

ditto — ~~Co_2O_3~~

" Mn Hydrate

" Mn_2O_3

30% Cu 70 Fe

Take Oxalate ferric

Mix so there is 40% of

~~following sulphates~~ wet & [illegible] to dry

~~[illegible]~~

Sulphide of lead Ralph

reduced by H, [illegible]

No Hg

Sulphate Co, Ni, Ce, Mn, Sb

Mg, Titanium, Zircon, Niobium

Mo, Wo, Ur, Cr

Wea. SAT. SEPT. 2, 1905 Ther.

Sulphate Ba

Oxalate Lime.

~~[illegible]~~

Sulphide Lead

Sulphide Fe, proto anhydrous

" Bi,

" ~~[illegible]~~ Lead

" Cu gray sulphide

arrange so ferric ~~above~~ is — Contact with the anhydrous Sulfide before reduction in H, H not reducing the Sulfide & it acts as a Conductor —

Try a Cell in strong sulphide (liver Sulphur) Potash & see what it does — add S to KOH & fuse & Volatilize Excess Sulphur

Sulphuric K / Nitrous acid } best Electrolyte in cells Known for cells

Then H_2SO_4 HCl

Etc

Wea. SUN. SEPT. 3, 1905 Ther.

Working Smaltite
Roast then reduce to speiss
powder & put in boiling Sulphuric
it will oxidize the As to As_2O_3
which volatilizes & form CoS or
Oxide –

Pass SO_2 Hot over powdered
Speiss, CoS formed & As_2O_3
volatilized — 1030 HU in favor
of Above — St_5Co 175 As_2O_3 1547
whereas SO_2 only 710 HU.

Roast speiss to As_2O_3 Co–
pass CS — Carbon monox & reduce –
Oxy & S combine with Co Salt,

Try in group perchlorate
of K ClO_4 faster moving
ion than Cl which is
fast

Wea. MON. SEPT. 4, 1905 Ther.

K is fastest moving base
ion
Na slower Li very much slower

Group – 21% KOH, 4 gm NaOH
" " 8 "
12 "
" 2 gram LiOH
4 " "
8 " "
12 " "

Group 23% KOH
" 25 "
27 "
29 "

Have 1 group 4 gm LiCl.

[illegible]

Wea. TUES. SEPT. 5, 1905 Ther.

Group Sulfide Na
" " Li

Magnesium salts [illegible]
[illegible]
[illegible], fatty acid
not sol.

Dip [illegible] Cold [illegible]
in [illegible] glue [illegible]
of [illegible] Make hot with
5 gelatine 1 pt acid [illegible]
of K - Read -

Wea. WED. SEPT. 6, 1905 Ther.

Relative affinity of Sulphur
for metals -

Strongest Palladium
Mercury
Silver
Copper
Bismuth
Cadmium
Antimony
Tin
Lead
Zinc
Nickel
Cobalt
Iron
Arsenic
Thallium
Weakest Manganese

Wea. THUR. SEPT. 7, 1905 Ther.

Salt, Dissolved solution of Roasted Smaltite — fuse — form KS — $CoCl_2$ — AsCl.

Dissolve Roasted Smaltite in HCl — oxidize ~~the~~ must HCl [illegible] very little [illegible] — then reduce the arsenic acid to arsenious by SO_2 + crystalize out by [illegible] the solution — & [illegible] little As in sol. —

Can ox by Bleach —

Wea. FRI. SEPT. 8, 1905 Ther.

~~[illegible]~~ Roast Smaltite, Oxidize to arsenic acid

Then dry + mix with Salt fuse, get CoCl + Na arsenate.

~~[illegible]~~ add HCl, free arsenic acid

& Reduce by SO_2

Crystalize out.

---

add hypo soda to roasted ore it ~~pr~~ makes $Co(OH)$ + arsenite soda

filter off — ~~[illegible]~~

~~Crystalize to Arsenite by SO_2~~

Wea. SAT. SEPT. 9, 1905 Ther.

fuse roasted ore in
strong H_2SO_4 —
Heat & pass SO_2
to reduce arsenate
to metal + dissolve
Co + Ni to sulfate
filter off —

Soak some Reg
green in saturated
sol of N_2O_3 in
NH_4 + NH_4Cl, dry
& precipitate out
group —

Wea. SUN. SEPT. 10, 1905 Ther.

ditto Chloride in Methyl
dry — then precip by
KOH boil in dilute
KOH, dry.

See Greenlay in re:
Hg Electro Iron —

Soak green in acetate
Lead, precip by KOH
boil slightly in [illegible]
KOH, dry

~~Soak~~
Precip green with
Lead.
ditto antimony acc of
acts like Bi

Wea. MON. SEPT. 11, 1905 Ther.

RA—prep NaOH by KOH instead Na

Ice up it [illegible]

---

prep from Chloride by Na also K

ditto prep from Nitrate by K + Na

ditto Oxalate—

---

prep reg in boiling ditto Ice cold, & afterwards boil to get Basic one

---

Wea. TUES. SEPT. 12, 1905 Ther.

Prep Carbonate— afterwards prep by Na + boil—

Prep Chloride from Methyl ditto Ethyl—

Speak RA about making [illegible] by Electro Hg & precip & reducing by H & condensing Hg—off oxidizing by air & heat & distilling off & condensing Hg—

Wea. WED. SEPT. 13, 1905 Ther.

Try KOH, porous Anode
Hg Cathode deposit
Arsenic — then
remove Hg ~~[illegible]~~ distill
or heat w/ alkalys As
as As_2O_3 =
The black anode powder
melted again & dense
was [illegible] practically
pure —

Try mix with Reg [illegible]
mix to give 4 parts
Ag, [illegible] in form of
oxides — to form the
Stable Silver amalgam

Wea. THUR. SEPT. 14, 1905 Ther.

[illegible]

30 arsenic
~~[illegible]~~
60 Nitre
60 Carb Soda
[illegible] leave, [illegible] as OX + form
~~[illegible]~~ arsenite —
if OK — demand [illegible] Nitre & Carb till get
right amount —

also 30 arsenic
30 Sulphur
60 Carb Soda Solution

Try roasted ore + Nitre
[illegible] arsenate Soda +
[illegible] oxide —

Weat FRI. SEPT. 15, 1905 Ther.

New process
Co Ni anode Hg Cathode -
when nearly battery
draw off + let it
self oxidize Co will
oxidize 1st then nickel
doing it twice or 3
times should separate
them - by calculating
the oxide -

Wea. SAT. SEPT. 16, 1905 Ther.

Rogers Fred Ott make
some Eylet 006 Seif
frame roll some down
make 6 - group

Make some Iron plates
same or 005 + test,

Roasted Smaltite
Salt, melt + ohl Co
+ Ni goes off -
arsenate Na remains
or use Mag Na + Ca

Spun ~~blown~~ in arc
furnace with Mg
lining -

Wea. SUN. SEPT. 17, 1905 Ther.

[illegible] Uranium [illegible] green [illegible] Radium effect [illegible]

Try arsenide anode in KS also KS polysulphide use Ni Cathode from at anode NiCoS & Realgar which dissolves & slowly deposit As at Cathode, Can use a cloth to keep the powders apart

The CoNi with little arsenic Can then be melted to a Sponge anode & operation repeated until all arsenic out

Then CoS NiS roasted to Sulphide & purified

Wea. MON. SEPT. 18, 1905 Ther.

The sulfides ignited to oxide & CoO dissolved by dil. H_2SO_4 in which NiO is almost insol—

or Can be reduced & melted to anode & deposited in Hg as amalgam & allowed oxidize in warm air the Co & Fe oxidize 1st 2 operations should make it pure enough—

arsenic [illegible] solution [illegible] from [illegible] [illegible] others [illegible] — [illegible] slightly used to right [illegible]

Try — This refers to [illegible] of Copper along with arsenic [illegible] from [illegible] 1½ times the arsenic

Wea. TUES. SEPT. 19, 1905 Ther.

Cheap H_2S –

SO_2 passed thru with steam thru red hot anthracite [illegible] by roasting

SO_2 reduced to S by the Carbon water forms with red hot Carbon H & CO the H & S combine to form H_2S. Coke is kept red hot by injecting air in at intervals.

Another scheme action CO_2 on Sulphide of Sodium –

another scheme producer gas passed over hot pyrities — by action of Hydrocarbon & Hydrogen in the gas upon the S Evolved from the pyrities H_2S generated)

Try action of Ferric Chl on roasted Dantz Rec of As goes to arsenate & Ferric Chl reduced to Ferrous –

Wea. WED. SEPT. 20, 1905 Ther.

[illegible] crys in Cupric Chl sol arsenic thrown down by Caustic Lime or oxd of Cu

Impure Electrolyte worked thus

Newark Sulphates Copper Nickel & Fe Crystalized, the Arsenious & H_2SO_4 are yielded on boiling mother liquor Chicago blue stone crystalized out Mother Liquor evap when mix of blue stone & arsenious acid comes out. The mix of As_2O_3 & $CuSO_4$ is wet with just enuff water to dissolve the $CuSO_4$ & no As_2O_3 —

Perth Amboy – $CuSO_4$ crystalized – Mother liquor, treated Fe throw down Cu & [illegible] mix of Cu & 60% arsenic which sold for arsenic & green coloring [illegible]

Wea. THUR. SEPT. 21, 1905 Ther.

at Mansfield
With density 30 [illegible] amps per inch
from Sulphate Solution -
Arsenic is deposited in spongy
state at this low density
the Sulphates of Ni Co are —
Crystalized out, if any Copper in
it is deposited with the As
spongy — the Cu is then dissolved
out of the arsenic by weak
H_2SO_4 —

Try Thiosulphate Soda on Smaltite
also roasted ore -

Try Smaltite anode
Chl Soda with little
free HCl, keep slightly
acid -

Wea. FRI. SEPT. 22, 1905 Ther.

Reason NaCl didn't work
the Na precipitated the As along
with Co as fast as formed -

Try Chl Calcium this will
deposit Calcium at Cathode
& give Chlorine -

Then, Sol when saturated
with As_2O_3 CoCl NiCl
can be Electrolyzed by
keeping it acid [illegible]
As_2O_3 on Cathode,
or crystalizing Co Ni Cl
out until Mother
Liquor free Co Ni —
The next to last Mother
liquid put back in
Electrolyte —

Try the mud from NaCl
which is mixed CoOH NiOH
& metallic arsenic

Wea. SAT. SEPT. 23, 1905 Ther.

the $NiOH$ + $CoOH$ possibly be dissolved out with weak acid, say HCl — as I do not think the Co & Ni is combined,

Dissolve roasted Daly [illegible] HCl — with excess acid & crystalize & see how free [illegible] Co the are

---

also Electrolyze with platinum anode & Ni cathode get As out of Sol —

Send for Acheson Catalogue & prices sizes etc order dot graphite anodes

Wea. SUN. SEPT. 24, 1905 Ther.

Can reduce As from Very Cold solution of Cl with Zinc very little Co will deposit & no Ni —

Electrolyze $NaCl$ with free $NaOH$ & circulate the liquid until all is Hypo — then put into another cell with Smaller anode & this will give arsenate & the Co will be thrown down as [illegible]

also use Na & $NaCl$ together as Electrolyte with Arsenide Anode 1st Electrolyze so to get it Hypo of [illegible]

Wea. MON. SEPT. 25, 1905 Ther.

fix up chem room up
stairs for Electro Work

Weigh [illegible]
Fe_2O_3 [illegible]
No washing
dry precipitat
[illegible] +
give it to [illegible]
[illegible] —

Also to make a
[illegible] wash nickel
with an excess of
Na Sulphate
by adding it — [illegible]
low heat

Wea. TUES. SEPT. 26, 1905 Ther.

Auto 20 ft [illegible]
Wind Res 10 miles 7.36
20 " 29.2
40 116.8

[illegible] Copper solution
Arsenious acid on
Salts & H_2SO_4 sol.
[illegible] of Cu
can be [illegible]
out + used again
[illegible] all the
arsenic

Wea. WED. SEPT. 27, 1905 Ther.

Cost of reducing Fe_2O_3 to
Metal at Silver Lake —

Cost of Hydrogen

Iron	41615 lbs	1.725 c	717.8[illegible]
H_2SO_4	1c lb	72155 lbs	721.5[illegible]
Sundries			30.1[illegible]
Labor			207.41

$FeSO_4$ produced 112424 lbs — $1677.3[illegible]

Metallic Fe produced
16220 lbs. .103 Cents lb
for Hydrogen

Reduction Cost	Labor	.0295
		.0022
Sundries		.0074
Coal		
		.0391

Total gas .103
Reduction .039

Cents 14.2

14.2 Cents lb.

Wea. THUR. SEPT. 28, 1905 Ther.

Wea. FRI. SEPT. 29, 1905 Ther.

Bismuth Notes
[illegible] sulphide

One deposit of [illegible] in the
Globe found at Phoenix [illegible]
found in considerable quantity in
certain veins in Boulder
& La Plata County Colorado
Bismuth Queen lode 5 mi
from Golden Colorado
vein 2 to 8" wide, [illegible]
metal occurs as Bismuthite
Bismuthinite [illegible]
80% of the metal -
Tetradymite [illegible]
Bi recently been
identified in [illegible]
one Ton of Bismuth metal was
made at Loveland Colorado
in 1886 -
Combination [illegible] in 1886
Consisting of

Wea. SAT. SEPT. 30, 1905 Ther.

The Bolivian Co - The Royal Saxon
Co & proprietors of the
Australian Mines -
[illegible] prices from 1.14 lbs to
187 lbs.

Bi recently been found in
certain Copper [illegible]
from Montana but none
[illegible]

Several veins carrying Bi have
been found at a point 12 miles
west of Beaver City Utah
occurs in Dolomite & vary from
1 to 9 ft in thickness
Entire vein matter is said to
assay from 1 to 6% metal it
is thus low grade [illegible] an
concentrated [illegible]
[illegible] it is thought can
be made profitable [illegible]
low grade ore is Native
Bi with pyrite & galena carrying

Wea. SUN. OCT. 1, 1905 Ther.

some Ag in a Quantity [illegible]
One of the veins, The "Bismuth"
in Granite district, [illegible]
discovered in 1860 shipped a lot of
ore in 1891 which is said to
have carried 9% The
developments are small
consisting of a number of short
prospecting shafts & tunnels

In Colorado a number of
occurrences are reported
particularly in Hinsdale
Boulder, Jefferson, La Plata
& San Juan Co's
in the area of San Juan
North the Comstock has
identified several Bi [illegible]
a small specimen from
the Gladiator mine

Wea. MON. OCT. 2, 1905 Ther.

Lake City District Hinsdale
Co showed 51% Bi
carrying Ag at rate of
1.544 oz to Ton —

A grayish green impure oxide
[illegible] found near Tucson
Arizona

Bi is reported occurring
in flank of Mount Vostovia
Alaska —

1905 USGS Says Bi
Both production & price
controlled by Johnson
Matthey & Co of London —
& the Govt of Saxony

Says Colorado has greatest
number of Bi minerals
& largest quantity ore

Wea. TUES. OCT. 3, 1905 Ther.

Near Sodaville
Esmeralda Co Nevada
a vein been opened
for 900 ft which is from
20 inches to 4 ft wide
carrying Bismuthinite
ore averaging 14% Bi

Near Newfoundland
Boxelder Co Utah
Bi ore high grade
reported to occur
associated with Copper ore

Inyo Co California
at Antelope northwest side
of Deep Spring Valley
large pyrite vein being
cont where at shown
Rich Bi Carb ores found

Wea. WED. OCT. 4, 1905 Ther.

see p 236 Oct 1888
Cal State Geol Survey

Bismutite in Gaston Co
NC in yellowish white
concretions —

Tetradymite Te 48 Bi 53
occurs in Va at Whitehall
gold mine Spotsylvania Co
& Monroe mine Stafford Co
& Tellurium mine Fluvanna Co
in NC, Davidson Co about 5
mi west of Washington mine
in foliated scales & lamellae
[illegible] along w/ an chalcopy
magnetite, Specularite, limonite,
in Georgia Lumpkin Co
4 mi E of Dahlonega
al[illegible] in Cherokee & Polk Co

Wea. THUR. OCT. 5, 1905. Ther.

As sublimes at 180 Cent
so Can be sublimed in a [illegible]
better use of yellow sublimate from
[illegible] by SO_2 in reaction
Realgar [illegible] might be [illegible]
Sulphur

My Roasted ore [illegible]
by H_2SO_4 with [illegible]
Copper — or Cementation
Copper by reducing Cu by
Iron —

~~Dissolve Roasted ore in H_2SO_4
add Zinc & [illegible]
as Hydrate [illegible] in Red hot
tube & [illegible] Bunsen
burner — [illegible]
all gone — [illegible]
by Zinc [illegible]
then precip the Ni by
KOH,~~

Wea. FRI. OCT. 6, 1905 Ther.

[illegible] Sulphur & [illegible] thoroughly
Roasted also [illegible]
ore /

[illegible] roasted ore with
[illegible] Barium — also $CoCl_2$

Dissolve Roasted ore in
H_2SO_4 — then add iron
Turnings & precipitate the
Co & Ni. Wash precip
use the Sulphate of
to [illegible] fractionate
by Crystallizing the Co Ni
Sulphates & [illegible]
[illegible]

Wea. SAT. OCT. 7, 1905 Ther.

Sources Bismuth
Lake Co furnished 253 Tons
in 1900, Ouray Co 65 Tons
6 to 12% ore both [illegible]
1 @ 2 oz gold 5 to 6 oz Ag
price 8 to $11 per 2000 lbs in
ore, went to [illegible] Malthy & G
London – it was purchased
for them by the Leadville
Sampler. The State ore
Sampling works at Denver
prices
10% ore 150 Ton 15% ore
250 20% $350, 30% 550
40% 750 50% $1000 lbs.

Bi found in Chaffee Co
Summit, Larimer Colorado
San Juan Co Colorado
Section Between Maggie
& Picayune gulches of
Red Peak is the Bismuth
ore [illegible] Low gold + Ag
Ni Cu + Mo principal ingredients

Wea. SUN. OCT. 8, 1905 Ther.

Boil long time roasted
Co Ni Arsenide –
with Sulphide Soda in
Excess – this forms As
Sulfide which dissolves
& leaves Co Ni Fe Ag
Sulphides –
Use weak acid –
dis out the iron –
Then – roast &
dis in H_2SO_4 –

[illegible] Sulfate Co Ni
by 33% [illegible] throw
down the Co from
[illegible] Co some [illegible] &
[illegible] liquor do [illegible]
till all Co [illegible]

Wea. Mon. Oct. 9, 1905 Ther.

Heat of formation by H_2S in sol of metallic oxides

Na_2O	1 mol in 1 Liter	3.15
$2NH_3$	" "	3.10
BaO	1 " in 10 "	3.70
MnO	precipd	5.10
FeO	"	7.30
ZnO	"	9.50
PbO	"	13.3
CuO	"	15.8
HgO	"	24.35
Ag_2O	"	27.40

[illegible] for Engineering News also Engineering Magazine

Wea. Tues. Oct. 10, 1905 Ther.

Recap [illegible] for the ~~[illegible]~~ sulphate with NaOH obtaining ZnOH [illegible] and Comp [illegible] ~~[illegible]~~ first H_2O then KOH [illegible] ZnOH and then washed

Ditto Sul Copper & [illegible] CuO by KOH which [illegible] NaOH, or fundamental solvent for CuO and NaOH, get porosity

Ditto Alumina

ditto Manganous OH These would all cause lost in battery possibly some solvent [illegible]

Wea. WED. OCT. 11, 1905 Ther.

Make 2 [illegible] plates
with [illegible]
[illegible]
Roll with [illegible]
[illegible]

[illegible]
pure [illegible]
[illegible]

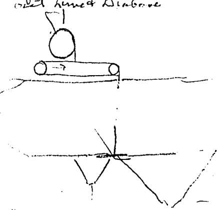
prepare Sulfide [illegible]
[illegible]
[illegible]

prepare Nitrate [illegible]
Nitrate Bi + Sulfite Soda
little [illegible]
+ [illegible]

Wea. THUR. OCT. 12, 1905 Ther.

[illegible] K
[illegible]
[illegible]
[illegible]

Size 1st Carload + Blow to throw
out Lime + Diabase



See if Diabase or Accessories is
Magnetic

prepare a mix of 33 FeO Sulfide 66 Fe_2O_3
and on Lime [illegible] ore crushed to
pass 30 mesh - Dry + pull out
Lime with magnet —

perhaps the Magnetic Sulfide make
Metallic Silver [illegible]

HCl Solution

Wea. FRI. OCT. 13, 1905 Ther.

Precip by HS in acid Sol.

Solubles

As	Mo	Hg	Bi	
Sb	Ir	Ag	Pb	
Sn	Se	Pb	Cu	Not acid
Au	Te	Cu	Pd	
Pt			Fe	

So is only precip completely from solution not too acid —

Plat metals precip very slowly

Precip by ammon Sulfide in presence of ammon

Ni Co Fe Ur Mn Zn

as oxides

Al - Be Cr Tantalum

all rare metals

as oxides

Mg - Ca Sr Ba.

Wea. SAT. OCT. 14, 1905 Ther.

Let 70 lbs rolling crush

found of No 1 Co ore screen

see if can separate silver by flakes,

also crush 1/2 pound to 100 mesh

& Cyanide 3 or 4 days 1/2%

watch screen for flakes —

also try Chlorine - Bromine

also Hg & dissolve out by

Hypo Sulfite Na or NH4 &

The chances are that all

Silver is free & there is no

argentite

870 mg to pound of ore

to detect Ag metallic

crush 20 mesh &

pass dry HS gas showed

makes jet black

Wea. SUN., OCT. 15, 1905 Ther.

Try 80 % 20 [illegible]

Try group of Ni plated tubes over which is plated Cobalt,

group 1/2 Ni 1/2 Co flake

Look up the Wo Mo Cr mixed with 1/2 sent to Ralph L

As Co flake makes good Contact with Ni plated tubes but not Co plated in long run — mix Ni 1/2 thickness flake with Co flake for metallic Contact the Co flake serving for $Ni(OH)_2$ Contact —

70 grams 25 Co flake

10 Ni flake 1/2 thick

Wea. MON. OCT. 16, 1905 Ther.

Wea. SAT. OCT. 21, 1905 Ther.

Wea. SUN. OCT. 22, 1905 Ther.

1	1043
2	1075
1 -	1056
2 -	1046
1	1070
2	1006
1	1044
2	1096
1	1074
2	1053

2 — 1067
1 - 1057

3)3130
1043 -

3)3225
1075

3)3167
1056

3)3137
1046

3)3211
1070

3)3221
1074

3)3020
1006

3)313[illegible]
1044

3)3289
1096

3)3158
1053

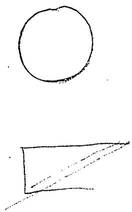
1053
1096
~~1006~~
1046
1075

4)4270
1067

1043
1056
1070
1044
1074

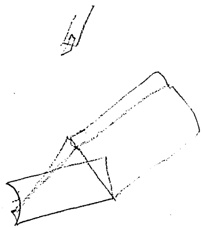
5)5287
1057

Wea. MON. OCT. 23, 1905 Ther.



Wea. TUES. OCT. 24, 1905 Ther.

Wea. Fri. Oct. 27, 1905 Ther.

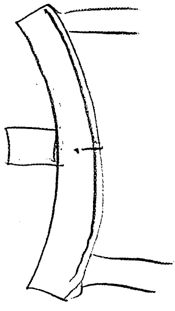


Wea. Sat. Oct. 28, 1905 Ther.

Wea. THUR. NOV. 16, 1905 Ther.

Wea. FRI. NOV. 17, 1905 Ther.

Wea. FRI. NOV. 24, 1905 Ther.



Wea. SAT. NOV. 25, 1905 Ther.

Wea. THUR. NOV. 30, 1905 Ther.

Wea. FRI. DEC. 1, 1905 Ther.

	Aug	July
Quarry		
Operating Labor	.067	.086
Repair "	009	019
Stripping "	.014	019
Supplies & renewals –	.011	013
Coal	.011	014
Dynamite	.017	046
	12.9	19.7
output	43520 Tons	33451
Railroad		
Operating Labor	.015	021
Repair	015	022
Supplies & renewals	006	008
Coal	.005	005
	.041	056
Tons	44920	33451
Crusher		
Operating Labor	1025	030
Repair "	014	013
Supplies & renewals	004	010
Coal	006	007
	.049	060
Tons	42920	33451

Wea. SAT. DEC. 2, 1905 Ther.

	August	Jul
Mixing + weighing		
Operating Labor	.013	015
Repair "	001	001
Supplies + renewals	001	003
Coal	015	019
Tons	66144	661[illegible]0

Chalk		
Operating Labor	036	043
Repair "	009	010
Supplies + renewals	010	013
	055	066
Tons	43556	35376

Kiln Plant		
Operating Labor	019	020
Repair "	008	006
Wheeling Clinker	006	005
Supplies + renewals	009	005
Kiln Coal	11.6	115
	15.8	1.51
Bbls	114395	1040[illegible]

Wea. SUN. DEC. 3, 1905 Ther.

	Aug	July
Coal Plant		
Operating Labor	005	006
Repair "	001	
Railroading Coal + Pile to [illegible]	002	001
Supplies + renewals	---	
	008	007
Bbls	104062	114595

Clinker Grinders		
Operating Labor	012	016
Repair "	010	010
Supplies + renewals	005	006
	027	032
Bbls	120372	96069

Gypsum -	034	034.

Pkg + Shipping		
Operating Labor actual pkg	017	016
Office wage + foreman	002	003
Repair Labor	005	009
Supplies + renewals	001	001
	025	029
bbls	121709	83558

Wea. MON. DEC. 4, 1905 Ther.

	Aug	Jul
Machine shop		
Opg Labor	048	052
Supplies & renewals	016	017
Coal	002	003
	066	072
Clinker Tons	21735	19772

Electrical Dept	058	066
Opg Labor	009	004
Repairs "	017	032
Supplies & renewals	084	102
Tons clinker	21735	19772

Power Plant	.141	.149
Operlg Labor	.098	018
Repairs "	034	031
Supplies & Renewals		
Coal	350	43.4
	53,3	63.2
Tons clinker	21735	19772

Wea. TUES. DEC. 5, 1905 Ther.

	Aug	July
Oil System		
Opg Labor	034	035
Repairs "	007	006
Supplies & renewals	015	014
Mill oil thro pipes	014	013
	070	068
Tons Clinker	21735	19772

Yards		
Opg Labor	031	030
Supplies horse fodder etc	005	007
	036	037
Tons Clinker	21735	19772

Office —		
Opg Labor	060	057
Supplies petty C. mech. sup.	024	036
Special etc. Salaries	021	027
	10.5	12.0
Tons clinker	21735	19772

Wea. WED. DEC. 6, 1905 Ther.

	Aug	July
Labor Cany(?)		
Op'tg Labor	.041	04[illegible]
Supplies renewals	007	00[illegible]
	048	04[illegible]
Tons Clinker	21735	19[illegible]72

Conveyors.		
Op'tg Labor	036	0[illegible]
Repair "	002	-
Supplies & Renewals	058	.161
	72.6	19.6
Tons Clinker	21735	19772

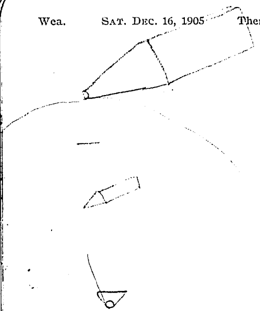
RR Main Line to [illegible]		
[illegible]		
Operating Labor	015	017
Repair "	015	018
Supplies & Renewals	007	008
Coal	.005	[illegible]
	042	048
Tons Clinker	19772	21735

Wea. THUR. DEC. 7, 1905 Ther.

Individual Costs

		%
Operating Labor	25368	36.9
Repair Labor	5632	.08.5
" " Plates	784	.01.1
[illegible] Rubber Belts	290	00.4
[illegible] with Yellow Powder	2704	04.0
Supplies & renewals	2713	04.0
Coal in Kilns	13306	19.5
Coal for all Power	8789	12.7
[illegible] Taxes	605	01.0
Gypsum	3983	05.8
Mill Oil	298	00.5
[illegible]	733	01.1
[illegible] Salaries	472	00.7
[illegible]	1672	02.4
[illegible] Limestone	310	00.5
[illegible] of No 2 Quarry	605	00.9
	68464	100.0%

Wea. SAT. DEC. 16, 1905 Ther.



Wea. SUN. DEC. 17, 1905 Ther.

Wea.	WED. DEC. 20, 1905 Cond	Water	Ther. Rev
1043 —	2"	1/4 —	308
1048	1/4	5/8	
1058	7/8	1, 3/8	436
	1/4 —	1 1/2	
	116 —		
	150		

Wea. THUR. DEC. 21, 1905 Ther.

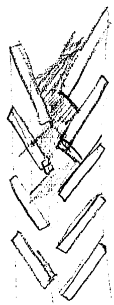
[illegible] dust
[illegible] dust
Light dust, think it light on 4 [illegible]
[illegible]

116 — 160
90 45
206 800
640
588 160
147
160

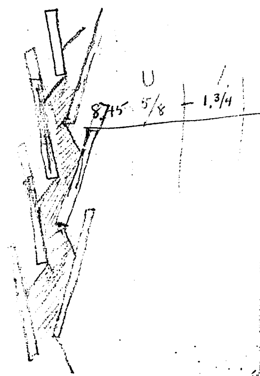
Wea. FRI. DEC. 22, 1905 Ther.

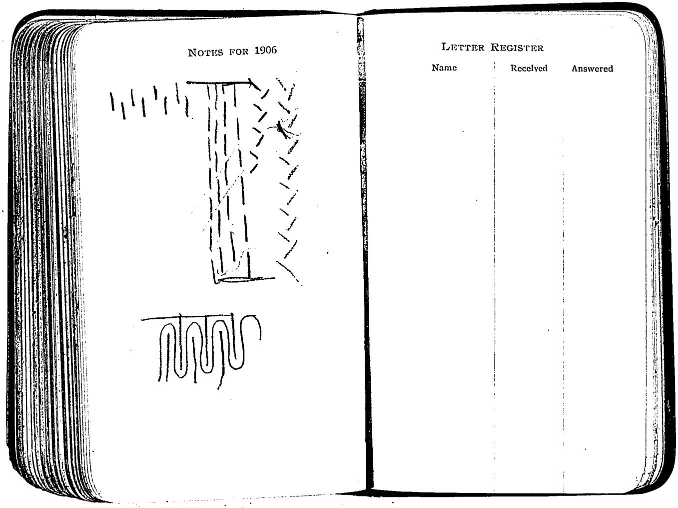
Wea. SAT. DEC. 23, 1905 Ther.

Wea. THUR. DEC. 28, 1905 Ther.



Wea. FRI. DEC. 29, 1905 Ther.




NOTES FOR 1906
LETTER REGISTER
Name
Received
Answered

Cash Account—May

Date		Received	Paid

288
520

288
520
576
7
1440
1497

150

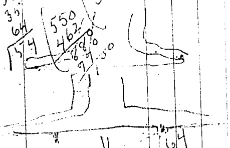
Cash Account—May

Date		Received	Paid

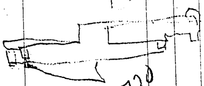
Cash Account—June

Date | Received | Paid

55
35
64
154 | 550 | 462 | 88 | 337 | 77 50



154 | 1090 | 47 60 | 64



720
623

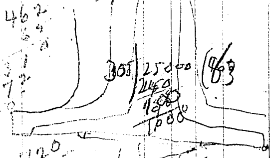
462

40
7
6

10% 75c
Cash Account—June
15 83
87

Date | Received | Paid

462
305 | 25000 | 240 | 10 | 1000 | 83



720
65
15000 | 75

43 | 400 | 35000 | 32000 | 3000 | 87

Cash Account—August

Date		Received	Paid

Cash Account—August

Date		Received	Paid

Cash Account—September

Date		Received	Paid
3) 860	3 60		
286	24		
114	144		
103	720		

3) 940

313

Cash Account—September

Date			Received	Paid
[illegible]	220	24		
[illegible]	230	25		
940	240	26		
[illegible]	250	27		
[illegible]	255	276		
[illegible]	276	3		

Cash Account—October

Date		Received	Paid
	9406 – Cant und[illegible]		
	Tunnel – 8 V M	C E	[illegible]

Cash Account—October

Date		Received	Paid

on 5 45 – pm –
Water – 5/16 –
angle index 3½ –
at 5 49 – wall
Rose to 6/16 –
5 51 – 8/16 – Index 2¼
5 55 – 9/16 – " 1.[illegible]
6 pm – 9/[illegible]
[illegible] Screen

CASH ACCOUNT—NOVEMBER

Date		Received	Paid
	3116 ft –		
	Starting 700 ft, weighing		
	2.3 lbs –		
	448 Horna		
	452 to Heightfields [illegible]		
	2nd [illegible]		
	495		
	Horna $538\frac{1}{2}$		

CASH ACCOUNT—NOVEMBER

Date		Received	Paid
	15		
	600		
	900		
	45		
	5		
	365		
		2250	
		600	
		317	
		129 00	
		32 00	
		45 00	

Cash Account—December

Date		Received.	Paid
[illegible]			
[illegible]			
Nov. 20 —		97 70	
" 21 —		[illegible]	
[illegible]		100	
Morning Nov. 23 —		98 45	
		737	

256
288
2048
2048
512
737 28

3145
1[illegible]
60

180
108
737
343

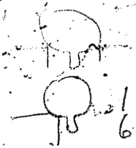
60.

2[illegible]
7[illegible]
46
664

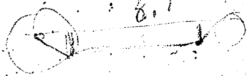
9 5.12

3)5.12
1.70

3)14.20
4.73
7.89



1893
6820
8713



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